

-Driscoll Ce.m

# ECOLOGICAL RISK ASSESSMENT FOR SAUGET AREA I

SAUGET ST. CLAIR COUNTY, ILLINOIS

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## Prepared for:

Solutia, Inc. 10300 Olive Boulevard St. Louis, MO 63141

#### Prepared by:

Menzie-Cura & Associates, Inc. One Courthouse Lane, Suite Two Chelmsford, MA 01824

Katherine A. Fogarty, PE

Project Manager

Susan Kane Driscoll, Ph.D.

Project Reviewer

Charles A. Menzie, Ph.D.

Principal

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#### **ACRONYMS**

AhR Aryl Hydrocarbon Receptor
AWQC Ambient Water Quality Criteria
COPC Compounds of Potential Concern

DAS Developed Area Soil

DDE Dichlorodiphenyl dichloroythelene, a breakdown product of DDT

DDT Dichlorodiphenyl trichloroethane, an insecticide EMPC Estimated Maximum Potential Concentration

FFG Functional Feeding Groups

IEPA Illinois Environmental Protection Agency
J Data Qualifier, Indicates Estimated Value

LEL Lowest Effect Levels

LOAEL Lowest Observed Adverse Effect Level

M Data qualifier; indicates estimated maximum potential concentrations for dioxins

MCPA 2-Methyl-4-chlorophenoxyacetic acid, an herbicide

MCPP 2-(2-Methyl-4-chlorophexoxy) proprionic acid, an herbicide

NOAEL No Observed Adverse Effect Level PAH Polynuclear Aromatic Hydrocarbons

PCB Polychlorinated Biphenyls
PEC Probable Effects Concentrations

QAPP/FSP Quality Assurance Project Plan/Field-Sampling Plan

RPM Remediation Project Manager

SEL Severe Effect Levels

SVOC Semi-volatile Organic Compounds
TCDD 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEC Threshold Effect Concentrations

TEF Toxic Equivalency Factor
TEQ Toxic Equivalency Quotient
TOC Total Organic Carbon
TRV Toxicity Reference Value

U Data Qualifier; indicates not detected above given detection limit

UAS Undeveloped Area Soil

USEPA United States Environmental Protection Agency

USFWS United States Fish and Wildlife Service

USGS United States Geological Survey VOC Volatile Organic Compounds

#### 1.0 INTRODUCTION

This baseline ecological risk assessment for Sauget Area I in Sauget and Cahokia, Illinois, addresses Dead Creek surface water and sediment and surficial floodplain soils. Figure 1-1 shows the site locus. The risk assessment follows the work plan for the project (Ecological Risk Assessment Work Plan for Sauget Area I, Sauget, St. Clair County, Illinois, Prepared for Solutia, Inc., St. Louis, MO, Menzie-Cura & Associates, Inc., August 12, 1999; Appendix A) and notes where deviations from the work plan exist due to unanticipated differences in site conditions. It also addresses comments from regulatory agencies received in April and May, 2001.

With the agreement of the United States Environmental Protection Agency (USEPA) Remediation Project Manager (RPM) Michael McAteer, the portion of the ecological risk assessment that addresses the aquatic habitat of Dead Creek is restricted to a portion of Dead Creek Segment F and the Borrow Pit Lake. Creek Segments B through the upper portion of F are subject to a Unilateral Administrative Order (UAO) issued by the USEPA on May 31, 2000 to Monsanto Company and Solutia Inc. (Docket No. V-W-99-C-554) pursuant to section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 as amended, 42 U.S.C. Section 9606(a). The Order requires the following response activities at Sauget Area 1 Creek Segments B and Site M and Creek Segments C, D, E, and F upstream of the Terminal Railroad Association embankment, which are located in Sauget and Cahokia, Illinois (Figure 1-1):

- Preparation of a Time Critical Removal Action Work Plan;
- Implementation of the Removal Action in accordance with the Work Plan to mitigate the threats posed by presence of contamination in Dead Creek sediments and certain adjacent soils and their potential migration via overflow and flood waters from the Site;
- Removal of materials from CS-B (creek sediments, creek bed soils and flood plain soils); CS-C, D, and E (non-native creek sediments only); and Site M (pond sediments and pond bottom soils) in Sauget Area 1, while minimizing adverse impacts to area wetlands and habitat;
- Proper handling, dewatering, treatment and placement of such materials in the on-site Containment Cell;
- A plan for management of Dead Creek storm water during the removal action;
- Sampling and analysis of areas where materials has been removed, for the purpose of defining remaining contamination;

- Placement of membrane liner material over CS-B and in all other excavated areas where, based on post-removal sample results, such liner is determined to be necessary; and
- Design of a containment cell which will provide adequate protection to human health and the environment.

The Order requires Solutia to conduct these removal activities to abate a potential imminent and substantial endangerment to the public health, welfare or the environment that may be presented by the actual or threatened release of hazardous substances at or from the site.

Currently, the UAO is being modified by the Agency to include removal of sediments in Creek Section F from Route 157 to the eastern boundary of the Borrow Pit Lake. Approximately 5,000 cubic yards of sediment will be removed from this 5,300 foot long stretch of Dead Creek and contained in the on-site disposal cell being constructed adjacent to Creek Section B.

These removal actions do not address Dead Creek floodplain soils. These are evaluated in a screening-level terrestrial ecological risk assessment.

## 1.1 Regulatory Guidance

The assessment follows current USEPA guidance in:

Ecological Risk Assessment Guidance For Superfund: Process For Designing and Conducting Ecological Risk Assessments (USEPA, 1997); and

Guidelines for Ecological Risk Assessment (EPA/630/R-95/002F, April 1998).

Previously, Environment and Ecology, inc. conducted a Preliminary Ecological Assessment of Dead Creek Segment F (environment and ecology, inc., 1997) for the USEPA, which essentially provides the screening analyses required in Steps 1 and 2 of the guidance (USEPA, 1997). This work was based on a site visit conducted in April 1997, and the collection of eight sediment samples (and one duplicate) from Dead Creek Section F and the Borrow Pit Lake. (Their terminology referred to the entire area as Dead Creek Section F.) Their "background" sediment sample was collected from the Borrow Pit Lake. Their observations indicated that:

The vegetation is of low floristic quality, consisting primarily of invasive and pioneer plants. This is consistent with the fact that the wetlands were drained and the woods cleared prior to the 1930s, and the surrounding land is highly

disturbed by agriculture and industry. However, the site does provide good quality wildlife habitat, as evidence by its use by the Black-Crowned Night Heron, a state-listed endangered species. Also, there are plentiful detrital inputs (twigs, bark, and leaf litter) to the creek, which provides a substantial food base to benthic invertebrate populations. One limitation to the benthic invertebrate population is the lack of riffle areas and therefore, a potential for periods of low dissolved oxygen levels.

Their data indicated that some metals, polychlorinated biphenyls (PCB), polynuclear aromatic hydrocarbons (PAH), and dioxin concentrations in sediment were above ecological screening levels. They concluded that the site warranted further investigation of ecological risks.

# 1.2 Site Description

Sauget Area I has been subjected to multiple historic industrial discharges, waste disposal and manufacturing activities over an extended period of time. A detailed description of site history and use is presented in the Engineering Evaluation/Cost Analysis, Remedial Investigation/Feasibility Study, Sauget Area 1, Sauget and Cahokia, Illinois, prepared by Roux Associates, Inc., March 9, 2001. Sauget Area 1 is centered on Dead Creek, an intermittent stream that is approximately 17,000 feet long, and its floodplain. Dead Creek is an industrialized drainage channel that flows through industrial, commercial, residential, and agricultural areas (Figure 1-1). Three closed municipal/industrial landfills (Sites G, H, and I), one backfilled wastewater impoundment (Site L), one flooded borrow pit (Site M), and one borrow pit backfilled with concrete rubble and demolition debris (Site N) are within Sauget Area I and the Dead Creek floodplain.

In the past, Dead Creek received direct wastewater discharges from industrial sources and served as a surcharge basin for the Village of Sauget municipal sewer collection system. When the system became backed up or overflowed, untreated wastes from industrial users of the sewer system were discharged directly into Dead Creek Section A. The culvert between Creek Sections A and B was blocked in 1968. Creek Section A was remediated and backfilled in 1990. The remainder of Dead Creek received wastes via downstream flow from Creek Section A prior to 1968. Creek Section B is hydraulically connected to Site M via a manmade ditch. Site M may have also received wastes in the past. Dead Creek continues to receive runoff from roadways, agricultural, industrial, and residential areas.

#### 1.3 Organization of the Report

All of the elements of a standard ecological risk assessment, as described in the standard guidance documents cited in Section 1.1, are contained in this report. However, the order of presentation of some of the elements has been changed to facilitate the implementation of a

weight-of-evidence approach for risk characterization. The organization of this report is presented below.

#### 1.0 INTRODUCTION

This section provides an introduction to the project and an overview of applicable regulatory guidance.

#### 2.0 BACKGROUND

This section discusses relevant background information for the site.

#### 3.0 PROBLEM FORMULATION

This section presents the Conceptual Site Model and identifies ecological receptors. The Problem Formulation section of the risk assessment was previously outlined in the scope of work for the project (Menzie-Cura & Associates, Inc., 1999; Appendix A).

#### 4.0 SELECTION OF ASSESSMENT AND MEASUREMENT ENDPOINTS

This section identifies Assessment Endpoints and Measures of Effects, although these elements are typically discussed in Problem Formulation.

#### 5.0 EXPOSURE ASSESSMENT

This section briefly describes the data used in the ecological risk assessment and the selection of COPCs.

#### 6.0 ECOLOGICAL EFFECTS ASSESSMENT

This section briefly describes the approaches that are used to assess ecological effects.

#### 7.0 RISK CHARACTERIZATION

This section presents the interpretation of the data. This section discusses measures of effects, together with other measures that are used to evaluate the individual assessment endpoints.

#### 8.0 DISCUSSION OF ECOLOGICAL RISK

This section discusses the weight-of-evidence for each assessment endpoint.

#### 9.0 DISCUSSION OF UNCERTAINTIES AND EXPOSURE ASSUMPTIONS

This section analyzes the uncertainties associated with the risk assessment.

#### 10.0 FINDINGS

This section briefly presents the findings of the assessment.

#### 2.0 BACKGROUND

This section provides a description of Dead Creek, the Borrow Pit Lake, and reference areas.

#### 2.1 Dead Creek and the Borrow Pit Lake

Dead Creek begins immediately south of Queeny Avenue in an industrial area of Sauget, Illinois and flows slowly south through residential neighborhoods (Figure 1-1). Along most of its length, the stream is bordered by a dense, narrow band of riparian trees and shrubs. Homeowners have cleared to the creek's edge and have established lawn along several sections. Creek Section B runs from Queeny Avenue south to Judith Lane, Section C from Judith Lane to Cahokia Street, Section D from Cahokia Street to Jerome Street, and Section E from Jerome Street to the intersection of Routes 3 and 157. Section F begins at the intersection with Route 3, crosses the intersection, passes through a culvert at railroad tracks, and continues to the southwest toward the Borrow Pit Lake. As discussed in Section 1.0, this ecological risk assessment addresses Dead Creek Section F from the railroad culvert south and the Borrow Pit Lake (Figure 2-1). Photographs of this area showing the predominant habitat types are in Appendix B.

West of Route 3, the creek flows south and west through the American Bottoms floodplain. This area contains active and abandoned agricultural land divided by levees and railroad right-of-ways. After Dead Creek flows under the railroad right-of-way, it is joined by a stream draining land from the north.

The Borrow Pit Lake is a borrow pond that was excavated during the construction of the local levee system. It covers approximately 530,000 square feet (approximately 200 feet by 2,650 feet). The United States Geological Survey (USGS) map of the area (Cahokia) indicates that the pond was dug to its current shape sometime after 1954. The pond is the largest non-flowing water body in the area. Its shore is surrounded with mature riparian trees. During time of high water, Dead Creek drains the pond through a pump station under a levee and flows into a ditched section of Old Prairie du Pont Creek. Storm water is allowed to accumulate in the Borrow Pit Lake until the water level reaches Elevation 10. Then the lift pumps are activated and accumulated water is pumped to Old Prairie du Pont Creek. This storm water management practice turns the Borrow Pit Lake into a storm water retention basin subject to large fluctuations in water level. The of channel of Old Prairie du Pont Creek flows northwest to Arsenal Island on the Mississippi River.

During the site reconnaissance and sampling in September, October, and November of 1999, water levels were extremely low in Dead Creek and the Borrow Pit Lake. Many areas of these water bodies were dry with exposed mud. Fish and other aquatic species (e.g., frogs) were concentrated in shallow puddles. These low water levels were persistent region-wide.

Observations made in the field in 1999 indicate that the water level in the Borrow Pit and Creek Sector F were low. This may be due to natural fluctuations in water level and may also be linked to the particularly dry growing season in 1999. Dead Creek is a series of small, shallow bodies of standing water. Examination of the creek bed and riparian vegetation suggests that Dead Creek does not retain substantial amounts of standing water during the summer months and that water levels are dependent on relatively recent precipitation. A memorandum authored by Bill McClain of the Illinois Department of Conservation dated July 23, 1992 to Tom Crause and dated received at the Illinois Department of Natural Resources on July 27, 1992 contains observations of Creek Sections B through F, indicating that a low water level is a normal condition in Dead Creek. Historical information obtained from a 1984 survey conducted in the American Bottoms by IEPA (1989) indicated that 12 out of 14 streams were at low flow conditions in summer. The report indicated that low to extremely low dissolved oxygen concentrations and elevated total suspended solids, total dissolved solids, turbidity, total phosphorus, and metals are common. Streams in the mid American Bottoms Basin (the area of Dead Creek) exhibit the greatest impact on macroinvertebrates and are considered moderate to limited aquatic resources.

Historical discharge data was obtained from the United States NWIS-W Data Retrieval system, maintained by the US Geological Survey (USGS), for other creeks in St. Clair County Illinois. The closest of these to Dead Creek were Canteen Creek (1972-1982), Mud Creek (1972-1982), and Richland Creek (1989-1999). A review of the historical discharge data from these creeks indicates a high variability in discharge over each year. However, for a large portion of each year, discharge is very low, often near zero. Both of these patterns occur each year, suggesting that low to zero flow conditions, as seen in Dead Creek in 1999, are common.

Section 7.2.1 provides additional detailed description of the habitat of Dead Creek and the Borrow Pit Lake.

### 2.2 Reference Areas

Reference areas for ecological risk assessment were selected during the ecological site reconnaissance and during the main sampling event. Details of the selection, summarized below, are included in the field report (Soil, Ground Water, Surface Water, Sediment, and Air Sampling Field Sampling Report, Sauget Area 1, Remediation Technology Group, Solutia, Inc., St. Louis, MO, O'Brien & Gere Engineers, Inc., September 2000).

The following criteria were applied for the selection of reference areas:

- a) physical similarity to Dead Creek or the Borrow Pit Lake
- b) location away from direct influence of industrial discharges, including major highways.

The reconnaissance survey was carried out over a three-day period in September 1999. The selection of reference sampling stations was discussed with Mr. Michael Ondrachek of Weston, who served as representative for the USEPA.

Two reference areas were selected during the reconnaissance survey. Reference Area 1 was a section of Old Prairie du Pont Creek near the town of East Carondelet, approximately 3 miles southwest of the end of Dead Creek in the Borrow Pit Lake. This section of Old Prairie du Pont Creek is a broad shallow water body with a mud substrate similar to the Borrow Pit Lake. It is distant from any influence from the site or other industrial areas, but is similar to the Borrow Pit Lake in that it is near agricultural land. Two sampling locations were selected in Reference Area 1. These are depicted on Figures 1-1 and 2-2; photographs are in Appendix B. It was not possible to obtain permission to sample in the second water body selected as a reference area during the reconnaissance survey.

To replace the second reference area selected during the reconnaissance survey, two bodies of water in Monroe County, collectively referred to as Reference Area 2, were selected during the main sampling event with the concurrence of Mr. Steven Broadman of Weston, the Agency's oversight contractor. These water bodies were approximately 20 miles south of Dead Creek and contained one sampling station each. Reference area 2-1 was in Long Slash Creek north of the culvert where Merrimac Road crosses the creek. This section was similar to Dead Creek sectors B through E in that it was shallow and muddy. It was similar to Dead Creek Section F in that it traversed an agricultural area. Reference area 2-2 was a flooded borrow pit north of Fountain Creek and was similar in depth, hydrology, and surrounding land use to the Borrow Pit Lake. These reference areas are shown on Figures 2-2 and 2-3. Photographs are in Appendix B. Table 2-1 presents water quality and sediment type in Dead Creek Section F, Borrow Pit Lake, and the reference areas.

Extensive effort was made during the site reconnaissance survey and the main sampling event to select appropriate reference areas. After completion of ecological sampling and preparation of the ecological risk assessment, the regulatory agencies in the end did not agree that the selected areas were appropriate to use as a reference area for Dead Creek or the Borrow Pit. Therefore, as directed by the regulatory agencies, the data collected from the reference areas will be presented in the report, but comparisons will not be made between measurements made at the site and the reference areas.

#### 3.0 PROBLEM FORMULATION

The problem formulation phase of an ecological risk assessment develops the nature of the problem and presents a plan for analyzing data and characterizing risk. The problem formulation section of this assessment defines the assessment and presents a conceptual model that describes key relationships between potential stressors and assessment endpoints. Assessment endpoints are expressions of the environmental value to be protected at a site that are selected by the consensus of the regulators, the regulated community, and state or local concerns. The problem formulation for this risk assessment was presented in the project work plan (Appendix A).

# 3.1 Conceptual Site Model

The foundation of an ecological risk assessment is the conceptual site model. According to USEPA guidance, the conceptual model addresses:

environmental setting and contaminants known or suspected to exist at the site; contaminant fate and transport mechanisms; mechanisms of ecotoxicity and likely categories of potentially affected receptors; complete exposure pathways.

Figure 3-1 provides a diagram of the Conceptual Site Model for the aquatic habitat of Dead Creek; Figure 3-2 is a diagram of the Conceptual Site Model for the terrestrial habitat of the floodplain. These models illustrate transport of compounds from the site media through the potentially affected habitats to important ecological receptors.

# 3.1.1 Environmental Setting and Contaminants Known or Suspected to Exist at The Site

The environmental setting is the aquatic environment of a shallow stream, broader semi-impounded basin, and floodplain as described in Section 2.1 of this report. The compounds of potential concern (COPCs) are selected in Section 5 of this report and include herbicides, pesticides, PCBs, metals, PAHs, and dioxins.

#### 3.1.2 Contaminant Fate and Transport Mechanisms

In general, the source of COPCs to Dead Creek Section F and the Borrow Pit Lake is downstream transport of industrial and municipal wastewater discharges from upstream portions of Dead Creek. Groundwater discharge in the upstream portion of Dead Creek in the vicinity of Sites G, H, I, and L does not appear to be a source for two reasons:

The EE/CA and RI/FS study performed by Roux Associates, Inc. (2001) indicated that except in times of a high water table, the bottom of Dead Creek and Borrow Pit Lake are above the water table.

Sampling of shallow groundwater in the Dead Creek floodplain indicated that COPCs have not been transported from Dead Creek to shallow groundwater or vice versa.

In addition, there has been little transport of creek sediments to floodplain soils.

The selected COPCs (herbicides, metals, PCBs, pesticides, and SVOCs) adsorb onto particulate matter to varying degrees. The transport mechanisms affecting particle distribution in aquatic systems include:

particulate runoff from the watershed,
deposition in areas of sluggishly flowing waters,
erosion in faster moving stream segments, and
resuspension of particulates from the stream bed and over the floodplain.

Chemicals with lower particle affinities may be more subject to dissolution in and transport by surface water. Increasing solubility generally correlates with increasing bioavailability. In particular, metals may be subject to transport in soluble form, depending on their valence states.

The major biological mechanisms affecting fate and transport are:

biological uptake directly from environmental media; bioaccumulation through ingestion of prey or media; and biomagnification through the food chain.

Most of the COPCs are subject to one or all of these biological fate and transport mechanisms. In particular, mercury, PCBs, organochlorine pesticides, and dioxins can biomagnify through the food chain.

- 3.1.3 Mechanisms of Ecotoxicity and Likely Categories of Potentially Affected Receptors
- 3.1.3.1 Ecotoxicity of Potential Site-Related Chemicals

The COPCs may affect the survival and reproductive capacity of benthic biota, fish, invertebrates, vascular plants, and wildlife. This section presents a short summary of the toxic mechanisms of some of the potentially site-related chemicals.

#### Herbicides

The available information on the effects of herbicides on plants, wildlife, aquatic organisms is largely confined to acute studies. Very few studies have investigated the chronic or subchronic effects of this class of compounds. In the USEPA's Environmental Effects Database (EEDB) (USEPA, 1995), toxicological data on terrestrial plants, insects, mammals, birds, and aquatic organisms (plants, invertebrates, fish) are available for the following herbicides:

- 2, 4-(dichlorophenoxy)acetic acid (2,4-D Acid);
- 2.4-(dichlorophenoxy)butanoic acid (2,4-DB Acid);
- 3,6-dichloro-2-methyoxybenzoic acid (Dicamba) and related compounds;
- 2-(2,4-dichlorophenoxy)propionic acid) (Dichlorprop(2,4-DP));
- 4-(chloro2-methylphenoxy)acetic acid (MCPA) and related compounds; and
- 2-(4-chloro-2-methylphenoxy)propanoic acid) (MCPP) and related compounds.

Summarized below are the effective concentration ranges of these herbicides for terrestrial and aquatic biota.

- Seed germination and seedling emergence of terrestrial plants is affected at 0.0027 to 4.2 pounds of herbicide acre of land.
- 3.6 to 100 ug of herbicide/insect will cause 50% of the test organisms to die.
- Dose of 400-800 mg herbicide/kg body weight resulted in death of 50% of the test mules.
- Herbicides at levels of 0.017 to 292 ppm can affect the growth of aquatic plant species.
- 100 to 35,440 ppm in food or 216 to 4640 mg/kg as a dose can result in 50% death of the exposed birds. Subchronic studies reveal that 1000 to 1600 ppm in food can lead to reproductive effects in birds.
- Aquatic invertebrates and fish are affected by herbicides at concentrations ranging from 1 to 1600 ppm. These effects include growth and mortality. Subchronic effects on invertebrates and fish fall within the acute effective concentration range.

#### Metals

Metals are naturally present in soil and sediment. Due to their varying toxicity, a few metals present in environmental media at the site will be discussed separately.

#### Arsenic

In many species of mammals, arsenic is a teratogen and carcinogen that can cross placental barriers and potentially cause fetal mortality or malformities. Wildlife may be exposed to

arsenic via ingestion, inhalation, or absorption through the skin or mucous membranes. Arsenic is usually transported into cells through an active transport mechanism intended for transport of phosphates. Studies have associated chronic arsenic exposure with liver, kidney, and heart damage, hearing loss, brain wave abnormalities, and impaired resistance to viral infections (Eisler, 1988).

The mechanism of arsenic toxicity depends upon its chemical form and route, dose, and duration of exposure as well as the species and lifestage exposed. In general, early developmental stages are more sensitive to arsenic toxicity than adults (Eisler, 1988). Arsenites (As<sup>3+</sup>) are more toxic than arsenates (As<sup>5+</sup>), soluble arsenic compounds are more toxic than insoluble compounds, and inorganic arsenic compounds are more toxic than organic derivatives (ATSDR, 1991). Trivalent arsenic reacts with sulfhydryl groups of proteins and enzymes. Pentavalent arsenic may interfere with oxidative phosphorylation (Eisler, 1988).

#### Cadmium

Cadmium can be bioaccumulated by both aquatic and terrestrial organisms. Dissolved cadmium is bioconcentrated in freshwater and marine animals to concentrations hundreds to thousands of times higher than in the water. Data also show that cadmium can accumulate in grasses, crops, earthworms, poultry, cattle, horses, and wildlife. Data on biomagnification of cadmium are inconclusive. In vertebrates, cadmium accumulates mainly in the liver and kidney rather than in muscle tissue, therefore, biomagnification through the food chain may not be significant (ATSDR, 1991). Cadmium has been implicated as the cause of severe deleterious effects on fish and wildlife.

#### Copper

The toxicity of copper to aquatic life is related primarily to the presence of the free cupric ion, Cu<sup>2+</sup> and possibly some of the hydroxy complexes (USEPA, 1984). Aquatic toxicity studies indicate that increasing alkalinity, hardness, and total organic carbon in natural waters decreases copper toxicity. Data for eight species indicate that acute toxicity decreases as hardness increases. Additional data for several species indicate that toxicity also decreases with increases in alkalinity and total organic carbon. Fish and invertebrate species seem to be about equally sensitive to the chronic toxicity of copper. Plants and phytoplankton are particularly sensitive to copper. Copper sulfate is used to treat algal blooms and growth of aquatic macrophytes in some lakes.

Copper is an essential nutrient for mammalian species. However, ingestion of elevated amounts of copper is associated with gastrointestinal, hepatic, hematological, musculoskeletal, cardiovascular, and renal effects, and changes in body weight in animals (ATSDR, 2000).

#### Lead

Exposure to lead may affect behavior and various body systems including the hematopoietic, skeletal, vascular, nervous, renal, and reproductive systems. In general, younger organisms are more sensitive to the adverse effects of lead exposure. In mammals, absorbed inorganic lead enters the blood and attaches to red blood cells. Lead is quickly distributed to extracellular fluid and other storage sites (possibly soft tissues and bone). Lead is excreted via bile to the small intestine for fecal excretion (Eisler, 1988).

Bioconcentration of lead has been observed in plants and animals. Generally limited by the strong absorption of lead to soil organic matter, the bioavailability of lead in soil to plants increases as pH and organic content of the soil decreases. There is no evidence that indicates that lead biomagnifies in terrestrial or aquatic food chains (ATSDR, 1993).

#### Mercury

Mercury is recognized as one of the most toxic of the heavy metals. Mercury is bioconcentrated and biomagnified in food chains. Mercury is not an essential element and has no known biological function. Studies have shown that it is a mutagen, teratogen, and a carcinogen. In general, younger life stages are most sensitive to the toxic effects of mercury. Organic forms of mercury (e.g. methylmercury) are more toxic than inorganic mercury (Eisler, 1987).

Numerous physical and biological factors can affect the acute and chronic toxicities and bioaccumulation of the various forms of mercury. For aquatic organisms, mercury accumulation is generally greatest at elevated water temperatures, reduced water salinities or hardness, reduced water pH, reduced organic matter content of the medium, and in the presence of zinc, cadmium, and selenium in solution. Elimination of mercury varies among aquatic species, however, it tends to be slow (Eisler, 1987).

Mammals can absorb organic forms of mercury through the respiratory tract, gastrointestinal tract, skin, or mucus membranes, and organic mercury compounds can cross placental barriers. Organic forms of mercury are more completely absorbed than inorganic forms, and they pass more readily through biological membranes and are excreted more slowly. Methylmercury can cross the blood-brain barrier (Eisler, 1987).

### Nickel

Nickel is considered moderately to highly toxic to most aquatic plant species. To invertebrates, nickel is one of the least toxic inorganic agents. To both marine and freshwater fish, nickel is relatively nontoxic but when exposed to low levels over extended periods effects include reduced skeletal calcification and reduced diffusion capacity of gills. Both acute and chronic toxicity of nickel is strongly related to water hardness.

#### Zinc

Zinc is an essential micronutrient for all living organisms. Because zinc is essential, zinc is bioaccumulated by all organisms. The toxicity of zinc is dependent upon its chemical form and degree of interconversion among the various forms. Zinc will not be sorbed or bound unless it is dissolved, but bound zinc will dissolve in the digestive tract following the ingestion of particulates. The toxicity of undissolved zinc to a particular species depends on the feeding habits. Aquatic plants and most fish are relatively unaffected by suspended zinc in the water column. Both terrestrial and aquatic invertebrates and filter feeder fish might be adversely affected by ingestion of sufficient quantities of particulates containing zinc. The acute toxicity of zinc to aquatic animals is influenced by several parameters including increasing hardness, abundant dissolved oxygen and low temperatures which lower its potential toxicity.

Reported acute toxicity testing for freshwater organisms indicates that insects are most resistant whereas cladocerans and the striped bass are the most sensitive to zinc.

#### **PAHs**

The PAHs have been categorized by the number of aromatic rings in their chemical structure as well as by their carcinogenicity in laboratory animals. Although naphthalene is a two-ringed molecule, it is frequently categorized as a PAH. The other compounds are listed below and are three, four or five-ringed structures.

2-Ringed PAH	3-Ringed PAHs	4-Ringed PAHs	> 4-Ringed PAHs
naphthalene	Acenaphthene	Benzo(a)anthracene	Benzo(b)fluoranthene
	Acenaphthylene	Benzo(a)pyrene	Benzo(k)fluoranthene
	Anthracene	Chrysene	Benzo(g,h,i)perylene
	Fluorene	Fluoranthene	Dibenz(a,h)anthracene
	Phenanthrene	Pyrene	Indeno(1,2,3-cd)pyrene

Many of the 4 to 7 ring PAHs are carcinogenic, mutagenic, or teratogenic to a variety of organisms including fish and other aquatic biota, amphibians, birds, and mammals. In addition to tumor formation, other adverse effects have been observed for many species under laboratory conditions including effects on survival, growth, and metabolism (Eisler, 1987). Rather than enhancing detoxification, metabolism of some carcinogenic PAHs in induced animals could result in a higher steady-state level of toxic products (Stegeman, 1981).

In mammals, PAHs are readily absorbed after exposure by inhalation or oral intake and distributed to many tissues in the body. However, intestinal absorption of PAHs is dependent upon the presence of bile in the stomach. PAHs are also absorbed via dermal exposure, although very little is distributed to tissues (USEPA, 1982). Following absorption, metabolism via the cytochrome P-450 monooxygenase system is required for detoxification to more water-soluble forms of the compounds for efficient elimination from the body. The unmetabolized PAHs are not believed to be carcinogenic. During the detoxification process, some PAHs are metabolically activated to their carcinogenic intermediates. These intermediates can then bind to cellular macromolecules such as DNA, RNA, and proteins, resulting ultimately in the induction of cancer. For any of the PAHs, however, the majority of the metabolism results in detoxified metabolites that are rapidly excreted.

The formation of PAH-induced cancers in laboratory animals is well documented (USEPA, 1982). The genotoxicity and carcinogenicity of benzo(a)pyrene [B(a)P] is well established. Experimental data demonstrate that exposure to B(a)P yields gene mutations, chromosome aberrations, and tumorigenesis in mammalian cells. B(a)P, the most widely studied PAH congener, produces tumors in mice, rats, hamsters, guinea pigs, rabbits, ducks and monkeys after oral, dermal, and intratracheal administration. Immune suppression has also been observed in humans and mice exposed to B(a)P. Developmental effects in utero and lymphoreticular effects have been observed in mice exposed to B(a)P.

There is very little data available on the effects of PAHs on birds. In one study, mallards fed diets containing 4,000 mg PAHs/kg (mostly as naphthalenes, naphthenes, and phenanthrene) for 7 months showed a 25% liver weight increase and 30% increase in blood flow to the liver when compared to controls. Another study showed that some PAHs may have embryotoxic effects in birds (Eisler, 1987).

#### **PCBs**

Polychlorinated biphenyls (PCBs) are a class of synthetic chemicals that contain 209 individual compounds (congeners). Aroclor is the industrial trade name of some commercial PCB mixtures.

PCB exposure may result in a variety of toxic effects to wildlife including death, birth defects, reproductive failure, liver damage, skin lesions, tumors, and a wasting syndrome. Two main factors influence the toxicological properties of individual PCBs: the octanol-water partition coefficient (K<sub>om</sub>) and steric factors which are determined by patterns of chlorination. Individual PCBs with high K<sub>om</sub> values and high numbers of substituted chlorines in adjacent positions are generally of greatest concern.

Sensitivity to adverse effects of PCBs varies greatly even in closely related species. Several studies have demonstrated that mink are one of the most sensitive mammalian species tested

for the effects of PCB exposure. It is well documented that PCBs interfere with reproduction in wildlife and in experimental animals. Reproductive failure due to high death rate of kits was observed in mink given diets supplemented with either 2 mg/kg Aroclor 1254 for 8 months or 5 mg/kg Aroclor 1254 for 4 months. Dietary levels of 1 mg/kg of Aroclor 1254 did not adversely affect reproduction. Placental transfer of PCBs has been documented in mink as well as in several other mammalian species. Mammary transport is an even more effective method of transferring PCBs from parent to offspring (Eisler, 1986).

The carcinogenic effects of PCBs have been reported in laboratory studies with mice and rats. Other systemic effects of PCBs reported in several species include hepatic disorders, increased thyroxin metabolism and ultrastructural changes in the thyroid, inhibition of ATP-ases, interference with oxidative phosphorylation, alterations in steroid hormone activities, immunosuppressive effects, and altered vitamin A metabolism (Eisler, 1986).

For birds, exposure to PCBs may result in disruption of growth, reproduction, metabolism, and behavior, such as courtship, nesting, and incubation. Signs of PCB poisoning in birds include morbidity, tremors, beak pointed upwards, and muscular incoordination, however, birds appear to be more resistant to acute effects of PCBs than mammals.

## Organochlorine Pesticides

Organochlorine pesticides are one of several classes of insecticides, which include the chlorinated ethane derivatives (DDT and methoxychlor), the cyclodienes (chlordane, aldrin, dieldrin, heptachlor, endrin, and toxaphene), and the hexachlorocyclohexanes (lindane).

The persistence of organochlorines in the environment varies with each individual compound. Organochlorines, including aldrin, chlordane, endosulfan, and heptachlor, are reported as ranging from moderately persistent, with effectiveness ranging from 1 to 18 months, to persistent, retaining toxicity for years, perhaps as many as 50 to 100 years (Briggs, 1992). Lindane, DDT, DDE, DDD, dieldrin, endrin, and methoxychlor are persistent insecticides (Briggs, 1992).

Organochlorine insecticides are classified as neurotoxins. DDT is believed to act on the sensory and motor nerve fibers and the motor cortex, inducing repetitive firing in the presynaptic nerve membrane (Klaassen et al., 1986). Although the central nervous system is the primary site of toxic action, primary pathologic changes resulting from subacute or chronic feeding are observed in the liver. Large doses of DDT in animal studies result in centrolobular necrosis of the liver, while smaller doses result in liver enlargement. Methoxychlor and lindane have low central nervous system toxicity. Lindane and alpha-BHC are convulsants, while beta and delta-BHC are CNS depressants. The mechanism of neurotoxic action of these compounds has not been demonstrated.

As a result of the bioconcentration of organochlorine insecticides in ecosystems, organisms at the top of natural food chains may sustain injury due to the gradual accumulations of residues in organisms that make up their food sources. Reproductive success of certain species of wild birds is adversely affected by exposure to DDT or its metabolites (Klaassen et al., 1986). Eggshell thinning has been demonstrated following ingestion of DDT and related chlorinated hydrocarbon insecticides. In addition, the ability of DDT to enhance the metabolism of estrogen may have an impact on reproductive success in birds by creating an endocrine imbalance affecting egg laying and nesting cycles (Klaassen et al., 1986). Fish and some lower aquatic organisms are extremely sensitive to the acute toxicity of DDT.

Significant evidence of endocrine disruption exists for the following groups of organisms: snails, oysters, fish, alligators and other reptiles, and birds, such as gulls and eagles (USEPA, 1997). Significant population declines as a result of exposure to endocrine-disrupting chemicals have been reported for alligators in Central Florida and some populations of marine invertebrate species

#### Dioxins and Furans

Dioxins and furans include two classes of halogenated aromatic hydrocarbons, or congeners. Furans are often referred to as "dioxin-like compounds" because their structure and toxicity are similar to dioxins.

Exposure to dioxins and furans has been shown to cause acute toxicity to the liver in rodents and rabbits and the thymus in guinea pigs. Epidermal effects, such as chloracne have been seen in subchronic studies with rodents and monkeys. Other effects due to chronic exposure to dioxin-like compounds are wasting syndrome, hepatotoxicity, enzyme induction and endocrine effects. In general, congeners without lateral substitution of chlorines and with greater number of chlorine substitutions are more toxic than other congeners.

There is evidence from animal and epidemiological studies that dioxins are furans are immunotoxic. These compounds have also been found to cause developmental and reproductive toxicity in animals. Dioxin-like compounds have also been found to be genotoxic by activating gene transcription through aryl hydroxylase activity (AHH). TCDD, the most potent of all the dioxin congeners, has been shown to be a multisite carcinogen in both sexes of mice and in hamsters. It is believed that there are multiple mechanisms for TCDD's "tumor promoting" activity. The carcinogenic effects of TCDD are hepatocellular carcinomas and hepatocellular hyperplastic nodules.

Early life stages of animals have been shown to be more sensitive to TCDD than adult animals. Studies have shown that TCDD is directly toxic to pike, rainbow trout, lake trout, and Japanese medaka. The toxic effects on young fry of these fish species are edema, hemorrhage, arrested growth and development, and death. TCDD has been shown to be

extremely toxic to bird eggs. Signs of toxicity are species-specific; however, embryo mortality is common to all species.

# 3.1.3.2 Potentially Affected Receptors

The categories of likely potentially affected receptors for an aquatic system such as the Dead Creek and the Borrow Pit include:

the benthic macroinvertebrate community;

warm water fish (e.g., largemouth bass);

waterfowl (e.g., mallard) that feed on plants and macroinvertebrates (including shrimp);

piscivorous birds (e.g., great blue heron, bald eagle);

insectivorous birds that feed on hatched insects that were exposed to COPC in sediment in the larval stage;

aquatic mammals (e.g., muskrat) that feed on plants and macroinvertebrates (including freshwater clams);

aquatic mammals (e.g., river otter) that feed on fish and macroinvertebrates (including freshwater clams).

Section 3.2 provides more detail on these receptors.

The possibility for exposure of terrestrial plants and wildlife to COPCs in soil or through soil-based food chains was also considered in the evaluation. The categories of likely potentially affected terrestrial receptors include:

terrestrial plants; soil invertebrates (e.g., earthworms); vermivorous mammals (e.g., short-tailed shrews) omnivorous or herbivorous mammals (e.g., white-footed mice); vermivorous birds (e.g., American woodcock).

These receptors were selected because they may be present in the Dead Creek floodplain and screening-level benchmarks are available for them. The benchmarks developed by Oak Ridge National Laboratory (Efroymson et al., 1997) were developed for plants, earthworms, and six additional species: short-tailed shrew, a vermivorous mammal; white-footed mouse, an omnivorous mammal; red fox, a carnivorous mammal; white-tailed deer, a herbivorous mammal; American woodcock, a vermivorous bird; and red-tailed hawk, a carnivorous raptor.

Efroymson et al. (1997) selected the lowest of these values which for wildlife represented the short-tailed shrew, white-footed mouse, and American woodcock. Screening values protective of these species will also be protective of the white-tailed deer and the carnivorous red fox and red-tailed hawk.

## 3.1.4 Complete Exposure Pathways

The USEPA guidance indicates that the risk assessment must identify complete exposure pathways before a quantitative evaluation of toxicity to allow the assessment to focus on COPCs that can reach ecological receptors. The likely complete exposure pathways in Dead Creek and the Borrow Pit Lake and the Dead Creek floodplain are:

Sediment to benthic invertebrates via direct contact and ingestion;

Sediment and surface water to aquatic plants via uptake;

Surface water to invertebrates and fish though direct contact and ingestion;

Benthic biota (including freshwater shrimp and clams) to higher order predators (e.g., fish) through the food chain;

Fish and macroinvertebrates (clams and shrimp) to piscivorous fish, mammals, or birds via ingestion;

Soil to soil invertebrates in the soils of the Dead Creek floodplain (including Sites G, H, I, L, and N) via direct contact and/or ingestion;

Soil to plants or wildlife in the Dead Creek floodplain (including Sites G, H, I, L, and N) via uptake through roots, direct ingestion, or ingestion via the food chain.

#### 3.2 Identification of Receptors

This subsection of the ecological risk assessment identifies the receptors (receptor species) and provides the rationale for their selection as representative of the species that occur or are likely to occur near the site. This subsection also provides an ecological characterization of each receptor for use in developing the exposure assessment.

The selected receptors represent those types of organisms most likely to encounter the contaminants of concern at the site. They include a reasonable (although not comprehensive) cross-section of the major functional and structural components of the ecosystem under study based on:

Relative abundance and ecological importance within the selected habitats;

Availability and quality of applicable toxicological literature;

Relative sensitivity to the contaminants of concern;

Trophic status;

Relative mobility and local feeding ranges;

Ability to bioaccumulate contaminants of concern.

The selected species represent different feeding guilds. A guild is a group of animals within a habitat that use resources in the same way. Coexisting members of guilds are similar in terms of their habitat requirements, dietary habits, and functional relationships with other species in the habitat. Guilds may be organized into potential receptor groups. The use of the guild approach allows focused integration of many variables related to potential exposure. These variables include characteristics of COPCs (toxicity, bioaccumulation, and mode of action) and characteristics of potential receptors (habitat, range and feeding requirements, and relationships between species). This approach evaluates potential exposures by considering the major feeding guilds found in a habitat. It is assumed that evaluation of the potential effects of COPCs on the representative species will be indicative of the potential effects of COPCs to individual member classes of organisms within each feeding guild.

The selected species represent the ecological community and its sensitivity to the contaminants of concern and were arrived at based, in part, on knowledge of the area and on discussions with the USEPA and other government agencies.

# 3.2.1 Aquatic Habitat

The ecological receptors selected for evaluation in Dead Creek and Borrow Pit Lake include: benthic invertebrates, shellfish, local fin fish, tree swallow, great blue heron, mallard, bald eagle, muskrat, and river otter.

#### Benthic invertebrates

Benthic invertebrates are potential receptor species in Dead Creek and the Borrow Pit Lake because they:

Have the greatest exposure to sediments;

Provide food for bottom-feeding fish species;

Provide food for bottom-feeding fish species, insectivorous birds, and waterfowl;

Are relatively immobile (sessile) in habit, and therefore their general health and condition reflects local conditions.

## Warm Water Fish Species

Warm water resident fish species were selected to reflect local sediment and water quality conditions. The typical warm water fish species such as centrachids (sunfish, bass) and bottom feeding fish such as bullheads are abundant local residents with a limited foraging range and are present in small ponds and borrow ponds throughout the region. These organisms are potential receptor species representing local fish because they are:

Resident in the Borrow Pit Lake;

Exposed to sediments as well as surface water,

Represent fish and higher order predators feeding on smaller fish and invertebrates.

Fish were abundant in the Borrow Pit Lake, but only a few small minnows were observed in Dead Creek Section F. Therefore, these receptors were evaluated in the Borrow Pit Lake only.

#### Aquatic Birds

We have selected tree swallow, great blue heron, mallard duck, and bald eagle to represent birds feeding on aquatic biota in Dead Creek and the Borrow Pit Lake for at least a portion of the time.

Tree Swallow (Iridoprocne bicolor)

Tree swallows are insectivores that consume flying insects. They feed over open or running water, and their diet consists almost exclusively of emergent adult forms of aquatic insects including Diptera, Hemiptera, Ephemeroptera, Zygoptera, Anisoptera, Plecoptera, and Trichoptera. Tree swallows will occasionally catch emerging insects directly from the water surface, but most insects are captured in flight. Tree swallows feed throughout the day, but the most intensive feeding occurs from late morning through late afternoon (Cohen, 1984).

These organisms are potential receptor species because they:

Consume aquatic insects that have been in contact with fish;

Have a foraging range smaller than the downstream area of the Dead Creek sectors;

Are a lower trophic level bird in the vicinity of the creek.

Tree swallows, therefore, represent insectivorous birds.

Great Blue Heron (Ardea herodias)

The great blue heron inhabits salt and freshwater environments, typically shallow waters and shores of lakes, flooded gravel pits, marshes and oceans. In marsh environments, the great blue heron is an opportunistic feeder; they prefer fish, but they will also eat amphibians, reptiles, crustaceans, insects, birds, and mammals. The diet varies but may include up to 100% fish. Great blue heron generally tend to forage near nesting sites (USEPA, 1993).

These organisms are potential receptor species because they:

Consume fish;

Have a foraging range about equal to the downstream area of the Dead Creek sectors;

Are a higher trophic level predator in the creek and Mississippi River.

Great blue heron, therefore, represent piscivorous birds.

Mallard (Anas platyrhynchos)

The mallard is the most common freshwater duck of the United States, found on lakes, rivers, ponds, etc. It is a dabbling duck, and feeds (usually in shallow water) by "tipping up" and eating food off the bottom of the water body. Primarily, it consumes aquatic plants and seeds, but it will also eat aquatic insects, other aquatic invertebrates, snails and other molluscs, tadpoles, fishes, and fish eggs. Ducklings and breeding females consume mostly aquatic invertebrates. The mallard's home range is variable, but an approximate range is 500 hectares. It prefers to nest on ground sheltered by dense grass-like vegetation, near the water.

Mallards are a potential receptor species because they:

Consume both aquatic plants and aquatic invertebrates;

Live on or near the water:

Are a lower trophic level duck in the creek and in the Mississippi River.

Mallards, therefore, represent waterfowl.

Bald Eagle (Haliaeetus leucocephalus)

Bald eagles are generally found in coastal areas or near lakes and rivers. Their preferred breeding sites are in large trees near open water. They are usually found in areas with minimal human activity. Bald eagles are federally-listed endangered species that overwinter in the Mississippi River valley north of Dead Creek and the Borrow Pit Lake. A pair of bald eagles was observed attempting to nest on the southern tip of Arsenal Island in 1993 and 1994. The nest has since blown down and has not been reconstructed (Collins, 2001). Two bald eagles were observed by USEPA and Illinois EPA representatives approximately 1 mile west of Dead Creek Section B and 0.5 miles east of the Mississippi River in late 1999. A bald eagle was also observed in the same location in December 2000.

Bald eagles, although primarily carrion feeders, are opportunistic and will eat whatever is plentiful including fish, birds, and mammals. Foraging areas vary according to season and location. The USEPA (1993) reports a foraging length of 2 to 4.5 miles along a river.

These organisms are potential receptor species because they:

Consume fish:

Are a higher trophic level predator;

Are sensitive to contaminants that biomagnify in the food chain.

The bald eagle, therefore, represents predatory birds.

**Aquatic Mammals** 

This assessment assumes that river otter and muskrat represent aquatic mammals in Dead Creek and the Borrow Pit Lake.

River Otter (Lutra canadensis)

The river otter can be found in primarily freshwater but also saltwater environments, but seems to prefer flowing-water habitats rather than still water. It has been found in lakes, marshes, streams, and seashores. It consumes largely fish, but is opportunistic and will consume aquatic invertebrates (crabs, crayfish, etc.), aquatic insects, amphibians, birds (e.g. ducks), small or young mammals, and turtles. They may also sift through sediment for food. The otter dens in banks, in hollow logs, or similar burrow-like places. Home range varies depending on habitat and sex, but an approximate measure is 300 hectares (USEPA, 1993).

River otter were not observed during the wildlife surveys that at the site. However, river otters were selected as a receptor because of the concern given to them in Illinois (the Illinois Department of Natural Resources has released river otters trapped in Louisiana as part of a recovery program), their susceptibility to bioaccumulative COPCs, and the fact that the stream and wetland habitat of Dead Creek and Borrow Pit Lake could support river otter.

River otters are a potential receptor species because they:

Consume fish and aquatic invertebrates;

Live in or near the water;

Are a higher trophic level predator in the creek and in the Mississippi River.

River otters, therefore, represent higher trophic level aquatic mammal.

Muskrat (Ondatra zibethicus)

The muskrat is a semiaquatic large rodent which lives near freshwater and brackish aquatic environments: marshes, ponds, creeks, lakes, etc. Muskrat feed largely on aquatic plants, but depending on location and time of year may also consume aquatic invertebrates (crayfish, crabs, etc.), small amphibians, turtles, fish, mollusks, and even young birds (USEPA, 1993). The muskrat lives quite close to the water, either on the bank of the water body or in a lodge constructed in the water body. Muskrat tracks and dens were observed in and along the upper reaches of Dead Creek during the wildlife surveys. The home range of muskrat is small (0.17 hectares on average) and one study found that muskrats remain within 15 meters of their primary dwellings 50 percent of the time (MacArthur, 1978).

Muskrats are a potential receptor species because they:

Consume aquatic plants and aquatic invertebrates;

Live on or near the water;

Are a lower trophic level omnivore in the creek and Borrow Pit Lake.

Muskrats, therefore, represent lower trophic level aquatic mammals.

# 3.2.2 Terrestrial Receptors

The ecological receptors selected for evaluation in the Dead Creek floodplain include: plants, soil invertebrates, woodcock, short-tailed shrew, and white-footed mouse. These receptors were selected because screening-level soil benchmarks are available for them that were

developed by Oak Ridge National Laboratory (Efroymson et al., 1997). Many of these receptors are present or likely to be present in the Dead Creek floodplain. In addition, these receptors were selected because they have a high exposure to soil via direct contact (plants and earthworms) or via ingestion of soil and earthworms (woodcock and short-tailed shrew) or plants (white-footed mouse).

#### **Plants**

Plants are potential receptors in the Dead Creek floodplain because they:

Are exposed to COPCs via direct root contact with soil and uptake of soil moisture through the roots;

Provide food for birds and mammals.

#### Soil invertebrates

Soil invertebrates are potential receptor species in the Dead Creek floodplain because they:

Have the greatest exposure to soil;

Provide food for birds and mammals;

Are relatively immobile in habit, and therefore their general health and condition reflects local conditions.

#### American woodcock (Scolopax minor)

Woodcock are a summer breeding species in Illinois. They inhabit woodlands and abandoned fields and feed mostly on soil invertebrates (predominantly earthworms). Because of their feeding method of probing soil for earthworms, they have a high percentage of soil in their diet (USEPA, 1993).

Woodcock are a potential receptor species in the Dead Creek floodplain because they:

Are likely to be present in and near the abandoned fields near the site;

Have a high exposure to soil contaminants via ingestion of earthworms and soil.

Woodcock, therefore, represent vermivorous songbirds.

Short-tailed shrew (Blarina brevicauda)

Shrews are ubiquitous and abundant in Illinois and can exist in almost any habitat (INHS, 1999). Short-tailed shrews generally consume insects, earthworms, slugs, and snails. If these are unavailable, they may substitute small mammals and plants. They burrow in and have close contact with soil.

Short-tailed shrew are a potential receptor species in the Dead Creek floodplain because they:

Are likely to be present in the Dead Creek floodplain;

Have a high exposure to soil via ingestion of soil and earthworms;

Have a high direct contact exposure to soil.

Short-tailed shrew, therefore, represent vermivorous small mammals.

White-footed mouse (Peromyscus leucopus)

White-footed mice can be found in brushy cleared areas and pastures and in streamside thickets. They eat mostly plant material, but can also eat insects and carrion (DeGraaf and Rudis, 1987).

White-footed mice are a potential receptor species in the Dead Creek floodplain because they:

Are likely to be present in the Dead Creek floodplain;

May be exposed to COPCs that have been taken up into plants.

White-footed mice, therefore, represent herbivorous small mammals.

# 4.0 SELECTION OF ASSESSMENT ENDPOINTS AND MEASURES OF EFFECTS

#### 4.1 Assessment Endpoints

Assessment endpoints are expressions of the environmental value to be protected at a site. Assessment endpoints are often not directly measurable. Therefore, the assessment employs measures of effects. These are biological or measurable ecological characteristics which reflect the assessment endpoint (USEPA, 1997). Where the assessment endpoint is not directly measurable, the use of a measure of effect may result in some uncertainty in the risk characterization. Ultimately, the selection of assessment endpoints requires the consensus of the regulators, the regulated community, and state or local concerns. The following assessment endpoints were selected for this ecological risk assessment in the work plan (Appendix A):

Sustainability (survival, growth, and reproduction) of warm water fish species typical of those found in similar habitats (incorporates the assessment of benthic macroinvertebrates). (Although this endpoint included crayfish in the work plan, this species was not observed in Dead Creek Section F or the Borrow Pit Lake. The field report (OBG, Inc., 2000) provides the details of these observations).

Survival, growth, and reproduction of local populations of aquatic wildlife represented by tree swallow, mallard duck, great blue heron, muskrat, and river otter (incorporates the assessment of benthic macroinvertebrates including shrimp and clams).

Survival, growth, and reproduction of individuals within the local bald eagle population that may overwinter near the site.

Survival, growth, and reproduction of local populations of terrestrial wildlife along the banks and floodplain of Dead Creek.

The assessment will evaluate risk relative to these assessment endpoints in Creek Section F, the Borrow Pit Lake, and the floodplain.

#### 4.2 Measures of Effects

The measures of effect direct data collection needs for the baseline ecological risk assessment. They provide the actual measurements for estimating risk. A weight-of-evidence approach (Menzie et al., 1996) weighs each of the measures of effects by considering:

Strength of association between the measure of effects and assessment endpoint;

Data quality; and

Study design and execution.

Strength of association refers to how well a measure of effects represents an assessment endpoint. The greater the strength of association between the measurement and assessment endpoint, the greater the weight given to that measure of effect in the risk analysis.

The weight given a measure of effect also depends on the quality of the data as well as the overall study design and execution. The data developed in the QAPP/FSP and collected as described in the field sampling report (OBG, Inc., 2000) provides information to evaluate each selected measure.

There is considerable uncertainty associated with estimating risks, because ecological systems are complex and exhibit high natural variability. Measures of effect typically have specific strengths and weaknesses related to the factors discussed above. Therefore, it is common practice to use more than one measure of effect to evaluate each assessment endpoint.

The assessment endpoints and associated measures of effect are summarized in Table 4-1. The endpoints and measures of effect were modified slightly from the work plan to better represent species observed at the site.

# 4.3 Weight-of-Evidence Evaluation

A weight-of-evidence evaluation takes into account the strengths and limitations of different measurement methods and considers the logical relationships among them by considering:

- 1. the level of confidence, or weight, given to the various measures;
- 2. whether the result of the measurement indicates there is an effect;
- 3. the strength of the result, and
- 4. concurrence among the various measures.

Some measures address different aspects of the same assessment endpoint. In these cases, the measures are examined separately as well as collectively. This avoids the possibility that these measures would inappropriately cancel each other out if they yielded conflicting information. For example, the benthic invertebrate community was evaluated with regard to the prey base it provides for fish. Because this type of effect is different from a direct toxic effect of chemicals on fish, measures of the benthic community were also evaluated separately from measures of fish toxicity.

Actual field measurements have been given a medium to high weight because they represent quantifiable conditions at the site. Qualitative field observations such as species presence/absence have been given a low to medium weight. Although these observations

provide information on site conditions, they are not quantifiable, and could vary depending on the time of year in which they occurred.

Many of the measures of effect used in this ecological risk assessment are a comparison to benchmark or literature-based values. These measures have been given a low to medium weight. Benchmarks and literature toxicity values represent potential effects based, for the most part, on laboratory studies, that may or may not relate to effects that may be in evidence in a field situation. Any screening level assessment (such as the comparison of soil concentrations to screening-level benchmarks) is given a low weight because of the high degree of conservatism built into such an assessment.

#### 5.0 EXPOSURE ASSESSMENT

This section describes the data used in this ecological risk assessment and selects COPCs for assessment.

# 5.1 Data used in Ecological Risk Assessment

The chemical data for surface water, sediment, and floodplain soil that were used in this assessment were collected in 1999 specifically for this project. Some older soil data were used for Sites G, H, I, L and N. The 1999 data collection followed the Quality Assurance Project Plan/Field-Sampling Plan (QAPP/FSP) for the project (Ecological Risk Assessment Quality Assurance Project Plan Field Sampling Plan for Sauget Area 1, Prepared for Solutia, Inc., St. Louis, MO, Menzie-Cura & Associates, Inc., August 12, 1999). The QAPP included sampling and analysis for dioxin congeners, herbicides, metals, polychlorinated biphenyls (PCBs), organochlorine pesticides, semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs). The field work was documented in:

Soil, Ground Water, Surface Water, Sediment, and Air Sampling Field Sampling Report, Sauget Area 1, Remediation Technology Group, Solutia Inc., St. Louis, MO, O'Brien & Gere Engineers, Inc., September 2000.

The data and data validation were originally presented in:

Sauget Area 1 Site, Support Sampling Project, Data Validation Report, Solutia Inc., St. Louis, MO, O'Brien & Gere Engineers, Inc., August 2000.

## 5.1.1 Sampling Locations

The chemical data used in this ecological risk assessment are by medium. The original sampling locations in the upstream reaches of Dead Creek presented a gradient of concentrations of various compounds. However, this assessment has been restricted to the farthest downstream portions of the creek, Section F and the Borrow Pit Lake.

Surface water: Surface water samples (designated "SW") were collected from Dead Creek Section F (3 samples), the Borrow Pit Lake (3 samples), and the reference areas (2 samples from each of two areas). Samples were co-located with surficial sediment samples collected for ecological risk assessment (designated "ESED"). These locations are shown on Figure 5-1 (Dead Creek and the Borrow Pit Lake), Figure 1-1 (reference area 1), and Figure 2-3 (reference area 2).

Sediment: Surficial sediment samples to be used for ecological risk assessment (designated "ESED" or "SED") were collected from depths of 0 to 2 inches from Dead Creek Section F (3 samples), the Borrow Pit Lake (3 samples), and the reference areas (2 samples from each of two areas). These sediment samples were co-located with surface water sampling locations. These locations are shown on Figure 5-2 (Dead Creek and the Borrow Pit Lake), Figure 1-1 (reference area 1) and Figure 2-3 (reference area 2).

An additional 37 sediment samples (designated "FASED") were collected from Dead Creek Section F and the Borrow Pit to evaluate the extent of migration of certain "industry specific chemicals". These samples were collected from the sediment surface to refusal (generally about 1 foot). These samples were only analyzed for petroleum hydrocarbons (TPH), total organic carbon, PCBs, copper, and zinc. Sample locations are shown on Figure 5-3. The TPH data were not presented or used here because TPH is a mixture of many compounds found in petroleum, and PAH and VOC data were available for ecological sediment samples.

Biota – Plants: Creeping buttercup (Ranunculus reptans) was selected as a target vegetation species due to its occurrence at many sample stations and its close proximity to surface water and exposed (dried) creek bed. This species was selected with the concurrence of Mr. Steve Broadhouse of Weston, the USEPA's oversight contractor. This species has a fleshy stem which would appear to make it appealing to herbivorous wildlife. It was the only vegetation observed in most sections of Dead Creek and the reference areas. No submerged or emergent vegetation was observed in Borrow Pit Lake. Two samples of creeping buttercup were collected from Dead Creek Section F (co-located with sediment sampling locations; Figure 5-4) and two samples were collected from the reference areas (also co-located with sediment sampling locations; Figure 1-1 and Figure 2-3). The entire plant was collected as a sample (rather than roots and stems separately) because the root system was very shallow and comprised a very small amount of the total plant mass. The plant was flowering at the time of sample collection so no seeds could be obtained. Two to four individual plants comprised a composite plant sample at each sampling station where plants were collected. A photograph of this species is in Appendix B.

Biota – Clams: Freshwater clams (Pyganodon grandis) were selected for analysis as macroinvertebrates because they are abundant in the Borrow Pit Lake and the reference areas. These clams are large (approximately 6 inches in diameter) and provide food for wildlife such as muskrat and river otter. Three composite freshwater samples were collected from the Borrow Pit Lake (Figure 5-4) and three composite samples were collected from the reference areas (Figures 1-1 and 2-3). Two to four individuals made up each composite. A photograph of this species is in Appendix B.

Biota – Shrimp: The work plan called for the collection of crayfish, but none were observed during the site reconnaissance or during the main sampling event. Traps were set overnight for crayfish during the site reconnaissance and none were caught. It is likely that the substrate

of Dead Creek and the Borrow Pit Lake is too silty and muddy to support crayfish. During the main sampling event the abundance of the shrimp species (*Palaemonetes kadiakensis*) was observed in Borrow Pit Lake and the reference areas. This species was substituted for crayfish because it is a decapod and would be a ready substitute for crayfish in the diet of wildlife. In particular, dabbling waterfowl and other water birds would be expected to consume shrimp. A photograph of this species is in Appendix B. One composite shrimp sample was collected from the Borrow Pit Lake and two composite samples were collected from the reference areas. The composites comprised many individuals and varied in total weight from 74 to 89 grams.

Biota – Fish: Fish were abundant in the Borrow Pit Lake but very few small minnows were present in Dead Creek Section F. The habitat and morphology of Dead Creek Section F were different from both the Borrow Pit Lake and the rest of Dead Creek, and although up to a foot of water was present in the portion of Section F upstream of the Borrow Pit, no fish were observed there. Whole bodies were analyzed for use in the ecological risk assessment. The data used in this risk assessment include: three composite largemouth bass samples from the Borrow Pit Lake and two each from each of the two reference areas; three composite brown bullhead samples from the site and three from the reference areas; and three composite forage fish samples from the site and three from the reference areas. Table 5-1 summarizes the number of fish per composite sample.

Soil: Surficial floodplain soil samples were collected from depths of 0 to 6 inches from developed (designated "DAS") and undeveloped (designated "UAS") areas. Sample locations are shown on Figure 5-5. Background soil samples (designated "BS") are also shown on Figure 5-5. The background soil locations were selected and approved during discussions with USEPA representatives during the development of the Site Sampling Plan. Soil samples are not available for the 6 inch to 24 inch interval which could also be an exposure medium for ecological receptors (in particular, invertebrates and burrowing mammals). The background surface soil samples were collected near the three groundwater monitoring wells used to evaluate upgradient groundwater conditions. These wells are on the east (upgradient) sides of Sites I, H, and L.

Four surface soil samples (0 to 6 inches) were collected from each of Sites G, H, I, L, and N. These Sites are shown on Figure 5-5. The only existing subsurface soil data for these areas were available from historical sources. These data were obtained from the following: Sauget Area 1 Data Tables/Maps, ecology and environment, inc., February 1998, prepared for USEPA Region 5 Office of Superfund, Chicago, IL, ARCS Contract No. 68-W8-0086, Work Assignment No. 47-5N60. The historical data are unvalidated, and detection limits were not available for the majority of results reported as not detected. Therefore, only results reported as detected were used in this evaluation. Any sample for which all results were reported as not detected was eliminated from further evaluation. Samples used in the subsurface soil evaluation are presented in Appendix C. Many of these subsurface samples came from depths greater than 2 feet. However, since these were the only subsurface data available for these areas, they were used in the screening level analysis.

The summary statistics for these data (by medium and site location or reference area) are presented in Appendix C.

# 5.1.2 Calculation of Summary Statistics

The data for each area and medium were summarized for use in the risk assessment. The steps used to summarize the data by area and medium are:

## Treatment of Duplicates

Data for samples and their duplicates were averaged before summary statistics were calculated, such that a sample and its duplicate were treated as one sample for calculation of summary statistics (including maximum detection and frequency of detection).

### Treatment of Non-Detects

Summary statistics were not calculated for constituents that were not detected in a particular area/medium. (For example, Dead Creek Section F sediment represents an "area/medium").

Where constituents were detected in some samples and not in others in a particular area/medium, one half the reported sample quantitation limit (SQL) was used to represent the concentration for the samples reported as nondetect.

For non-detects for which one half the SQL was calculated, one half the SQL was compared to the maximum detected concentration for that area and medium. Where one half the SQL was greater than the maximum detected concentration in a particular area/medium, the SQL value was not used in the calculation of summary statistics for that constituent in that area and medium.

## Frequency of Detection

The frequency of detection is reported as a percentage based on the total number of samples analyzed and the number of samples reported as detected for a specific constituent. The number of samples used to calculate statistics reflects the treatment of non-detects described above.

#### Minimum Detected Concentration

This is the minimum detected concentration for each constituent/area/medium combination, after duplicates have been averaged.

Maximum Detected Concentration

This is the maximum detected concentration for each constituent/area/medium combination, after duplicates have been averaged.

Average Concentration

This is the arithmetic mean concentration for each constituent/area/medium combination, after duplicates have been averaged and non-detects have been evaluated.

For most of the samples used in the ecological risk assessment, there were too few data to calculate a 95% upper confidence limit (UCL) on the mean, so the concentrations used in calculations were either the maximum concentration in that area/medium or the average concentration. For surficial floodplain soil, sufficient data were available to calculate a 95% UCL.

The equation used to calculate the 95% UCL is dependent upon the distribution of the data set. If data are normally distributed, the following equation is used (USEPA, 1992a):

95% 
$$UCL = \overline{x} + t(s / \sqrt{n})$$

where:

 $\bar{x}$  = mean of data

s = standard deviation of the data

t = student t-statistic

n = number of samples

If the data are lognormally distributed, the 95% UCL is calculated using the transformed data set and the H-statistic (USEPA, 1992). The data are "transformed" by using the natural logarithmic function, i.e., by calculating ln(x) for each x value in the data set.

$$e^{(\bar{x} + 0.5s^2 + sH/\sqrt{n-1})}$$

where:

e = base of the natural log, equal to 2.718

x = mean of the transformed data

s = standard deviation of the transformed data

H = H-statistic

n = the number of samples in the population

H-statistic and t-statistic values were obtained from Gilbert (1987).

The Shapiro-Wilk Test for Normality (W-test) is used to whether the transformed or the non-transformed 95% UCL better represents the data. The results of the W-test indicate whether the data set is more likely to be normally or lognormally distributed. The UCL based on the student t-statistic is selected where the data set is more likely to be normally distributed, while the UCL based on the H-statistic is selected where the data set is more likely to be lognormally distributed. The W-test values were calculated and compared for the log-transformed and untransformed data sets. If the log-transformed data have the higher W-test value, the data are assumed to be more lognormally distributed, and the H-statistic 95% UCL value is the appropriate UCL. Similarly, if the untransformed data have the higher W-test value, the data are assumed to be more normally distributed, and the t-statistic 95% UCL is the appropriate UCL.

Appendix C presents the summary statistics by area and medium.

# 5.1.3 Calculation of PCB and dioxin/furan concentrations

Samples were analyzed for PCB homologs, and polychlorinated dioxin and polychlorinated furan congeners. PCBs, dioxins, and furans are complex mixtures of individual congeners that have different volatilities, solubilities, and rates of biodegradation and metabolism as well as different toxicities. This section discusses how these data were handled in this ecological risk assessment.

Total PCBs were calculated by summing the concentration of the detected homologs and one half the detection limit for homologs that were not detected. If a homolog was never detected in any sample in a particular medium or area, it was not included in the total. Only two out of

ten homologs, hexachlorobiphenyl and pentachlorobiphenyl, were detected in ecological sediment samples and most site biota. An additional two homologs, heptachlorobiphenyl and tetrachlorobiphenyl, were detected only in largemouth bass tissue at the site. Additional homologs were detected only in the "industry specific" sediment samples (decachlorobiphenyl, nonachlorobiphenyl, octachlorobiphenyl, and trichlorobiphenyl).

Polychlorinated dioxin and polychlorinated furan congeners were evaluated collectively as a dioxin Toxic Equivalency Quotient (TEQ). 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is the most potent of a group of compounds that bind to an intracellular protein called the aryl hydrocarbon receptor (AhR). Other dioxin congeners also bind to this receptor and have been shown to exert toxic responses similar to those exerted by TCDD. The biological activity of these compounds seems to correlate with their binding affinity to this receptor (WHO, 1998). The toxic equivalency quotient (TEQ) approach was developed to represent the fractional toxicity of dioxin congeners relative to TCDD. TEQs are calculated as follows:

 $TEQ = \Sigma[$  (Dioxin-like Congener Concentration)<sub>i</sub> ·  $TEF_i]_n$ 

where,

TEF = toxic equivalency factor for congener i, and n = number of dioxin-like congeners in the mixture of concern.

Toxic equivalency factors (TEFs) for each dioxin-like congener are available for mammals (the same values used for humans), birds, and fish to account for differing wildlife sensitivities (Van den Berg et al., 1998).

TEQs for dioxins were calculated for each medium by multiplying the detected concentration (or half the detection limit) of each by its TEF and adding the products to obtain the dioxin TEQ. If a congener was never detected in a particular medium or area, it was not included in the total. Data designated with an "M" in the data validation to indicate "estimated maximum potential concentration" were also treated as not detected. According to the laboratory, an "M" is used to indicate that the information for the peak meets some but not all of the criteria required to establish a positive identification, i.e., not only is the quantitation estimated, but the identity of the constituent is also estimated. In the data validation process, the "M" qualified data were qualified as "U," or not detected, at the reported concentration because there was not a conclusive constituent identification.

# 5.1.4 COPC Selection Process

In this assessment, COPCs are selected for surface water, sediment, and biota. The selected COPCs are then carried through the ecological risk assessment.

The screening level evaluation for soil is in itself a comparison to benchmarks. Compounds with concentrations above soil benchmarks will not be carried through a baseline ecological risk assessment at this time. Therefore, the selection of COPCs does not address soil.

The selection of COPCs for ecological risk assessment was a multi-step process. The first step was comparison of combined surface water and sediment data to published benchmarks. Table 5-2 compares the maximum concentration detected in surface water of Dead Creek Section F and the Borrow Pit Lake to Illinois Surface Water Quality Standards (Illinois, 1999), National Recommended Water Quality Criteria (USEPA, 1999a), Great Lakes Initiative Tier II Water Quality Guidelines (summarized in Suter and Tsao, 1996), and other water quality guidelines assembled by Suter and Tsao (1996). Precedence was given to these standards and guidelines in the order given. If multiple values were available for a compound, the Illinois value superceded the national value, which superceded the Great Lakes value. Compounds that exceeded the corresponding benchmarks or for which no benchmark was available were retained as COPCs.

Table 5-3 compares maximum sediment concentrations for Dead Creek Section F and the Borrow Pit Lake to consensus-based sediment quality guidelines for freshwater developed by MacDonald et al. (2000), Florida sediment quality guidelines (MacDonald, 1994), and Ontario Sediment Quality Guidelines (Persaud et al., 1993). The use of these guidelines for ecological screening was recommended by Scott Cieniawski of USEPA Region 5. If the concentration exceeded any of the benchmark values, or no benchmarks value was available, the compound was retained as a COPC.

Compounds considered non-toxic (calcium, magnesium, sodium, and potassium) were not included as COPCs. In addition, two compounds were excluded as COPCs because they were detected at a very low overall frequency (ethylbenzene was detected in one sediment sample out of six at 11 ug/kg and in no other medium; 2,4-dimethylphenol was detected in one of two plant samples at 51 ug/kg and in no other medium). Ethylbenzene was not detected in upstream sediment (Sectors B, C, D, and E) and surface water (Sectors B, D, and E) samples. 2,4-dimethylphenol detected only once in an upstream plant sample in Sector B. Phenolic compounds (Salisbury and Ross, 1992) are naturally produced by plants.

As a final screen for COPCs presented on Table 5-4, additional compounds were retained as COPCs that were detected in site biota, but that had not been detected in surface water and sediment.

The resulting COPCs for ecological risk assessment in Dead Creek are: 2,4-D, 2,4-DB, dicamba, dichloroprop, MCPA, MCPP, pentachlorophenol, aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, fluoride, lead, manganese, mercury, molybdenum, nickel, selenium, silver, vanadium, zinc, total PCBs, total DDT, aldrin, alphachlordane, delta-BHC, dieldrin, endosulfan I, endosulfan II, endosulfan sulfate, endrin

aldehyde, endrin ketone, gamma chlordane, gamma-BHC, heptachlor, heptachlor epoxide, methoxychlor, acenaphthalene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, dibenzo(a,h)anthracene, diethylphthalate, fluoranthene, indeno(1,2,3-c,d)pyrene, and dioxin calculated as the toxicity equivalent of 2,3,7,8-TCDD. Note that total concentrations of DDT and PAHs were calculated as the sum of the concentrations of individual compounds detected in that sample using one half the detection limit for compounds not detected in that sample but detected in that medium and at that location.

# 5.1.5 Data Quality

To evaluate the quality of the data for ecological risk assessment, detection limits were compared to screening benchmarks to evaluate data quality objectives. These comparisons are presented in Appendix C and discussed below.

#### Surface Water

Table C-1-9 compares surface water detection limits to screening benchmarks. Detection limits were higher than screening benchmarks for beryllium, cadmium, total cyanide, selenium, PCBs, 11 pesticides, three PAHs, dibenzofuran, and three VOCs. Of these compounds, cadmium, selenium, PCBs, 8 pesticides, and benzo(a)pyrene were included as COPCs due to their detection in other media. There is some uncertainty in the overall analysis because these compounds could be present in surface water at a low concentration that exceeds a screening benchmark. The organic compounds, however, have very low solubility and are not expected to be present in surface water.

## Sediment

Table C-2-11 compares detection limits for ecological sediment samples to screening benchmarks. Detection limits were below screening criteria or screening criteria were not available for most of the analytes in sediment. The exceptions are discussed here.

Detection limits for total cyanide, 14 PAHs, bis(2-ethylhexyl)phthalate, and hexachlorobenzene exceeded sediment screening levels. These compounds were not detected in ecological sediment samples. Of the compounds mentioned above, six PAHs and bis(2-ethylhexyl)phthalate were selected as COPCs because they were detected in another medium. There is some uncertainty in the overall analysis because these compounds could be present in sediment at a low concentration that exceeds a screening benchmark.

The detection limits for silver, total PCBs, and 10 pesticides exceeded screening criteria in some samples. These compounds were detected in at least one sample, and with the exception of beta-BHC and endrin, were included as COPCs. Therefore, uncertainty due to detection

limits for these compounds is limited.

"Industry Specific" Sediment Samples

Tables C-2-12 and C-2-13 compare detection limits for the "industry specific" sediment samples to screening benchmarks for Dead Creek Section F and Borrow Pit Lake, respectively. Detection limits for PCBs exceeded the lowest screening benchmarks used to select COPCs, but not the TEC or LEL. Since PCBs were not screened out as COPCs in the "industry specific" sediment samples, there is little uncertainty resulting from these detection limits.

Surface Soils from Developed and Undeveloped Areas

Table C-4-12 compares the highest detection limit in Dead Creek floodplain soil (UAS and DAS samples) to screening benchmarks. Screening benchmarks for soil were available for few compounds detected in this medium. Detection limits exceeded soil screening benchmarks for selenium and thallium. The resulting uncertainty due to this assessment is slight because the highest detection limit for selenium, 1.3 mg/kg, is within the range of background for soil in Illinois (IEPA, 1994). The highest detection limit for thallium, 1.3 mg/kg, exceeds the screening benchmark of 1 mg/kg slightly and does not introduce much uncertainty into the assessment.

Surface Soils from Sites G, H, I, L, and N

Table C-4-13 compares the highest detection limit in surface soils from Sites G, H, I, L, and N to screening benchmarks. Screening benchmarks for soil were available for few compounds detected in this medium. Detection limits exceeded soil screening benchmarks for selenium and thallium, and the detection limit for some PCB homologs exceeded the benchmark for total PCBs. The highest detection limit for selenium, 1.2 mg/kg, is within the range of background for soil in Illinois (IEPA, 1994). The highest detection limit for thallium, 1.2 mg/kg, exceeded the screening benchmark of 1 mg/kg slightly. Although the detection limit for some PCB homologs exceeded the screening benchmark for PCBs, other homologs had detection limits below the benchmark. Therefore, the little uncertainty in the analysis results from these detection limits.

#### 6.0 ECOLOGICAL EFFECTS ASSESSMENT

The effects assessment summarizes and weighs available evidence regarding the potential for contaminants to cause adverse effects. These adverse effects may include impacts on growth, reproduction, and survival. The general approaches used to assess ecological effects are summarized below. Additional details are provided in the following sections.

# 6.1 General Approach for Assessment of Ecological Effects

Various approaches are used to assess risk to ecological receptors. These individual lines of evidence are evaluated to provide an overall weight of evidence regarding risk.

In the aquatic portion of the assessment, these include for benthic invertebrates and fish:

- Comparison of concentrations of COPCs in sediment and surface water to established benchmarks:
- Evaluation of sediment toxicity data;
- Analysis of benthic community structure; and
- Comparison of concentrations of COPCs in tissue to toxicity reference values (TRVs) that have been reported to cause adverse effects in similar organisms.

For aquatic wildlife (birds and mammals), the approach is:

• Comparison of estimated dietary doses to TRVs that have been reported to cause adverse effects in similar organisms. The assessment also uses observations of wildlife and habitat that have been made during several site visits to Dead Creek and the Borrow Pit Lake.

For terrestrial receptors, the approach is a screening level assessment that compares soil concentrations to available benchmarks for the protection of plants, soil invertebrates, and terrestrial wildlife.

## 6.2 Sediment and Surface Water Benchmarks

Concentrations of COPCs in individual sediment and surface water sampling locations are compared to benchmarks to assess the potential risk of adverse impacts to aquatic organisms, including invertebrates and fish. These benchmarks are described in this section.

#### 6.2.1 Sediment Benchmarks

The sediment benchmarks used for sediment were the lower of the freshwater Threshold Effect Concentrations and Probable Effects Concentrations developed by MacDonald et. (2000) and the Ontario Ministry of the Environment Sediment Quality Guidelines (Persaud et al, 1993). Note that exceeding these benchmarks is an indication of possible effects to benthic invertebrates, but does not indicate that effects are expected to occur.

# Threshold Effect Concentrations and Probable Effects Concentrations

MacDonald et al. (2000) evaluated previously existing sediment quality guidelines for freshwater ecosystems. Based on the strengths and weakness of each type of sediment quality guideline, they selected consensus-based criteria applicable to freshwater systems. They also evaluated the predictive ability of these guidelines. Their Threshold Effects Concentrations (TEC) represent concentrations below which harmful effects to benthic biota are unlikely to occur. Their Probable Effects Concentrations (PEC) represent concentrations above which harmful effects to biota are likely to be observed.

## Ontario Ministry of the Environment Sediment Quality Guidelines

The Ontario Ministry of the Environment (Persaud et al., 1993) developed Lowest Effect Levels (LEL) and Severe Effect Levels (SEL) for freshwater ecosystems. According to the authors, the Lowest Effect Level indicates a level of contamination which has no effect on the majority of the sediment-dwelling organisms, and the Severe Effect Level represents a level at which the sediment is considered likely to affect the health of sediment-dwelling organisms.

## 6.2.2 Surface Water Benchmarks

The primary benchmarks used for surface water were the Illinois Surface Water Quality Standards. These were selected as most appropriate for Illinois waters. If a state value was not available, the benchmarks used in order of priority were National Recommended Water Quality Criteria, Great Lakes Water Quality Initiative Tier II Criteria, and other benchmarks developed by Oak Ridge National Laboratory (Suter and Tsao, 1996).

## Illinois Surface Water Quality Standards

Illinois Surface Water Quality Standards were selected as the primary benchmarks. According to the Clean Water Act Section 304, States are allowed to establish their own criteria different from federal criteria that take into account site specific conditions or use other scientifically defensible methods. Therefore, these standards were selected as most appropriate for Illinois waters. Where appropriate, they were adjusted for the average water hardness of the water body.

# National Recommended Water Quality Criteria

National Recommended Water Quality Criteria (NRWQC) were developed under the Clean Water Act Section 304 for the protection of aquatic life for both freshwater and saltwater environments (USEPA 1999a). Development of these criteria requires results of at least eight acute toxicity tests from eight different families and three chronic tests. For metals, some AWQC are based on concentrations in the dissolved phase, rather than total concentrations, because dissolved metal concentrations more closely approximate the bioavailable fraction of metal in the water column. The surface water samples collected from Dead Creek, Borrow Pit Lake, and the reference water bodies were analyzed for total metals; therefore, the criteria were adjusted accordingly. Also, where appropriate, the criteria were adjusted to the average water hardness of the water body.

## Great Lakes Water Quality Initiative Tier II Criteria

Tier II values were developed for the Great Lakes Basin; fewer toxicity test data are required to establish these criteria than for the NRWQC (USEPA, 1995). The Tier II Values are concentrations that would be expected to be higher than NRWQC in no more than 20% of cases.

# Oak Ridge National Laboratory Surface Water Guidelines

Suter and Tsao (1996) developed alternative benchmarks from the toxicity literature for some compounds that do not have other criteria. These have been used if no other benchmark is available.

# 6.3 Sediment Toxicity Data

The measures of effects on benthic invertebrates included acute and chronic toxicity tests with two freshwater species at each sediment triad station including the reference areas. Ten-day acute toxicity tests were run with the amphipod *Hyalella azteca*. These tests measured survival and growth. A 42 day chronic survival, growth and reproduction toxicity bioassay was also run with this species at each location. A 10 day acute toxicity text that measured growth and survival was performed with a Chironomid larvae *Chironomus tentans* at each sediment triad sampling location. A 20 day chronic survival, growth, emergence, and reproduction toxicity bioassay was also run with each sediment sample for which survival was high enough to continue the test beyond 10 days. These tests were performed by Aquatec Biological Sciences of South Burlington, Vermont. Their laboratory reports are in Appendix E.

# 6.4 Benthic Community Structure

The structure of the benthic community is analyzed using several approaches that examine whether the COPCs in Dead Creek Section F and the Borrow Pit Lake may be exerting stress on benthic invertebrates. These include benthic community metrics that analyze abundance of individuals and diversity of species.

The results of these analyses are included in the weight-of-evidence analysis to assess impact at each sediment triad sampling location. The results are examined in comparison to factors that could influence benthic community structure such as concentrations of COPCs, sediment grain size and organic carbon content.

Descriptions of the various approaches to analyzing benthic community structure are provided in the following sections.

A number of different measures of benthic community health and diversity are used in this assessment which assesses numbers of benthic invertebrates at Dead Creek Section F, the Borrow Pit Lake, and reference areas.

- Abundance is a direct count of the number of individual organisms. The number of
  individuals is a measure of the "standing stock" of the benthic community and provides an
  indication of the ability of the benthic community to serve as a prey base for higher trophic
  levels.
- Taxa richness is a count of the number of different taxa (in most cases taxa are counted at the level of the species). The assumption is that high diversity is indicative of a benthic community with a greater diversity of microhabitats and a broader range of species with varying tolerances to physical, biological, and chemical interactions.
- The Shannon-Weiner Diversity Index (H') provides another useful comparative measure of benthic community structure (Begon et al., 1990; Gallagher, 2000). The index is species-based and assesses diversity using both the number of species (species richness) and the number of individuals (abundance) per species. Although more complex statistical testing can be employed to compare H' statistics, generally the greater the Shannon-Weiner Diversity Index, the greater the diversity of benthic species at a station.

The Shannon-Weiner Index is calculated as follows:

$$H' = -\sum_{i=1}^{s} p_{i} \log p_{i}$$

Where,

 $p_i$  = frequency of species i in the sample =  $\frac{N}{N}$ 

 $N_i$  = number of individuals of species i

N = total individuals in sample

S = number of species

# Simpson's Index

Simpson's index is a comparative measure of diversity that addresses species evenness. The Simpson's index of a benthic community sample is indirectly proportional to the heterogeneity of the community and will range between 0 and 1. Statistically, Simpson's index is a measure of the probability of two randomly selected organisms belonging to the same species (Cole, 1994). Samples in which a large proportion of individuals belong to a small number of species will have a high Simpson's index while a sample with individuals more evenly distributed among species will have a lower Simpson's index. The formula used to calculate Simpson's index, taken from Cole (1994) is:

$$\lambda = \sum_{p_i}^2$$

Where,

 $p_i$  = the frequency of species i in the sample.

## Modified Hilsenhoff's Biotic Index

Hilsenhoff's biotic index (HBI) is a species-specific community index which measures the proportion of species which are tolerant to disturbance. The underlying assumption of the HBI is that species deemed sensitive to disturbance decrease in abundance as disturbance to the community increases. Species specific tolerance values, taken from Barbour, et al. (1999), range from zero (extremely sensitive) to ten (tolerant), and are multiplied by the relative abundance of each species within a sample. The resulting values are summed to produce a single tolerance value for each sample. In cases where tolerance values were not available for a species, the tolerance value for the next taxonomic level was used, typically a single tolerance value for the entire genus. In general, the higher the tolerance value assigned to a benthic community, the greater the degree of impairment.

# 6.5 Toxicity Reference Values for Tissue Concentrations in Fish

Toxicity Reference Values for aquatic life are based on critical body burdens or concentrations of COPCs in animal tissues that correspond with toxicological effects. Comparison of actual measured tissue concentrations to critical body residues is a more direct and less uncertain measure of effect than are comparisons to water or sediment concentrations, which are often used as a surrogate for the concentration a the actual site of toxic action. Concentrations measured in samples of forage fish, largemouth bass, and brown bullhead are compared to these values to assess the potential for risk of harm to fish exposed to COPCs in the Borrow Pit Lake.

The US Army Engineer Waterways Experiment Station (WES), the research and development branch of the US Army Corps of Engineers, has developed the Environmental Residue Effects Database (ERED) (USACE, 2001). ERED compiles reports from the literature on adverse effects of COPCs based on whole body concentrations of COPCs in aquatic life. WES conducts a quality control review on entries and updates the database annually. A similar database compiled by US EPA (Jarvinen and Ankley, 1999) was also used. This ecological risk assessment uses both sources for development of toxicity reference values for fish.

Studies that examined effects on growth, survival or reproduction were selected for development of body burden toxicity reference values. If more than one appropriate study was available, the lowest of the lowest observed effects levels (LOAEL) and corresponding no observed effects level (NOAEL) were selected. Table 7-4 presents the test species, residue effect level, literature reference, and value selected.

# 6.6 Toxicity Reference Values for Dietary Doses to Birds and Mammals

The chronic NOAELs and LOAELs for the wildlife species are based on the results of laboratory studies reported in the literature. The NOAEL is the highest concentration of a particular contaminant at which no adverse effects are observed in the test species. The LOAEL is the lowest concentration of a particular contaminant at which adverse effects are observed in the test species. NOAELs and LOAELs are daily doses of chemicals (mg chemical consumed/kg body wt/day) which are compared to the exposure doses (mg/kg/d) calculated in the food chain models in Appendix F.

Sources of the chronic NOAEL and LOAEL doses for avian and mammalian species include Sample et al. (1996) and other sources. Values available in Sample et al. (1996), were preferred. If avian doses were not available in Sample et al. (1996), the USEPA ECOTOX on-line database and/or the scientific literature were searched. For those mammalian doses not available in Sample et al. (1996), the latest versions of toxicological profiles compiled by the Agency of Toxic Substances and Disease Registry (ATSDR), the USEPA Integrated Risk

Information System (IRIS), and/or scientific literature were searched for appropriate mammalian NOAEL and LOAEL doses.

NOAEL doses and LOAEL doses were taken from studies that met the following criteria:

- Close taxonomic relationship between the test species and the receptor species;
- Ecologically relevant endpoints Endpoints, such as reproduction, development, growth, and mortality, were chosen because they can lead to population-level effects;
- Appropriate exposure duration Chronic studies were considered to be longer than 70 days for birds and 1 year for mammals or for shorter periods during critical life stages;
- Appropriate exposure route Studies in which the test species received the chemical dose by the diet were preferred to those that in which the test species received an oral capsule or by gavage. However, for some chemicals, the only data available are gavage.

If only subchronic studies were available for selecting chronic NOAELs or LOAELs, an Acute to Chronic Ratio of 10 (Sample et al., 1996) was applied. If only a LOAEL was provided by the authors of the selected study, then the LOAEL was divided by a factor of 10 to derive the NOAEL benchmark. The resulting NOAEL and LOAEL doses are presented in Appendix F.

# 6.7 Benchmarks for Evaluating Soil Toxicity

Oak Ridge National Laboratory (Efroymson et al., 1997a) has developed preliminary remediation goals for soils based on toxicity to plants, soil invertebrates, and uptake into the food chain and subsequent effects on wildlife. The benchmarks for plants and earthworms were selected from literature data on field or laboratory studies (Efroymson et al., 1997b,c). The wildlife values were calculated using a food chain model for short-tailed shrew, white-footed mouse, red fox, white-tailed deer, American woodcock, and red-tailed hawk. They used the LOAEL values from Sample et al. (1996) and uptake factors (into plants, earthworms, and small mammals) from Efroymson et al. (1997), and Sample et al. (1997a,b). They then selected the lowest of the plant, earthworm, and wildlife values as a soil benchmark.

### 7.0 RISK CHARACTERIZATION

This section describes the measures of effect for each assessment endpoint, the data collected as part of those measures, and analyses performed with those measures to evaluate each assessment endpoint

# 7.1 Assessment Endpoint 1; Sustainability of Warm Water Fish

The COPCs may exert direct effects on warm water fish through exposure in the water, sediment, or prey, and indirectly by affecting their prey, the macroinvertebrate community. The associated measures of effects assess exposure pathways and potential effects. Some rely upon direct observations of conditions; some involve measures of toxicity; and others use literature values.

# 7.1.1 Measure of effect 1a: body burdens of COPCs in selected fish species

Purpose and Rationale. Fish exposed to bioaccumulative compounds in their diet or in water can accumulate these COPCs in their tissues. Contaminants tend to accumulate in organs such as the liver and kidney to a greater degree than in the musculature. However, COPC levels in tissue on a whole body basis are useful for evaluating risks to animals that eat fish. The assessment uses measurements of COPCs in fish tissue to evaluate exposure and effects on the fish, and to provide data for use in other parts of the assessment.

Approach. The assessment uses this endpoint to evaluate effects as a measure of effects, the assessment compares measured body burdens to literature values at which effects have been reported. The assessment will also use the body burden data in subsequent sections as input to the food chain exposure models for the representative piscivores (the great blue heron, bald eagle, and river otter).

Evaluation: Tables 7-1, 7-2 and 7-3 present concentrations detected in largemouth bass, brown bullhead, and forage fish (small minnows), respectively, from the Borrow Pit Lake and concentrations detected in these species in reference areas. Compounds detected in Borrow Pit Lake fish were: dicamba, MCPA, aluminum, chromium, copper, mercury, selenium, zinc, total PCBs, DDE, gamma chlordane, heptachlor, di-n-butylphthalate, and 2,3,7,8-TCDD TEQs in largemouth bass; dichloroprop, aluminum, chromium, copper, lead, mercury, zinc, total PCBs, DDE, alpha chlordane, gamma chlordane, heptachlor, bis(2-ethylhexyphthalte, diethylphthalate, and 2,3,7,8-TCDD TEQs in brown bullhead; and 2,4-DB, dicamba, dichloroprop, MCPA, pentachlorophenol, aluminum, chromium, copper, lead, mercury, selenium, zinc, total PCBs, DDE, bis(2-ethylhexyl)phthalate, diethylphthalate, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, and 2,3,7,8-TCDD TEQs in forage fish (minnows).

Table 7-4 presents NOAEL and LOAEL concentrations in fish tissue from the literature. Where the information is available, NOAEL and LOAEL concentrations have been selected for effects on mortality, growth, and reproduction or development. Tables 7-1, 7-1, and 7-3 also compare these values to the maximum concentration detected in site fish.

The only COPC for which a NOAEL or LOAEL body burden is exceeded in site fish is mercury. The maximum mercury concentration (0.26 mg/kg wet weight) but not the average mercury concentration in brown bullheads slightly exceeded the benchmark of 0.25 mg/kg mercury wet weight. This was due to one composite brown bullhead sample. The other two brown bullhead samples had lower mercury concentrations (0.05 and 0.075 mg/kg wet weight). The maximum mercury concentration in forage fish samples (0.6 mg/kg wet weight) also exceeded the benchmark, but the average concentration did not. This was also due to the concentration in one composite sample. The concentrations in the two other samples were 0.052 mg/kg wet weight and not detected at a detection limit of 0.1 mg/kg wet weight Largemouth bass concentrations did not exceed any of the available benchmarks. Note that body burden benchmarks were not available for all COPCs detected in fish.

The benchmark value of 0.25 mg/kg wet weight represents a no observed effects concentration for mortality, but a lowest observed effects concentration for reproductive effects (Friedmann et al., 1996). In a feeding study with walleye, a predatory fish, using low and high doses of methylmercury, Friedmann et al. (1996) found that ingestion of methylmercury in prey resulted in an inhibition of growth, testicular development, and immune function. The resulting body burdens from both the low and high methylmercury level diets were associated with these effects. The body burden associated with the low dietary level was 0.25 mg/kg mercury wet weight. Walleye with body burdens at this level exhibited the effects described above, but not mortality. Friedmann et al. point out that a concentration of 0.25 mg/kg mercury wet weight is within the range of mercury concentrations typically detected in North American fish. They gave a range of 0.03 to 0.7 mg/kg mercury (wet weight) in the Northeastern United States and Canada.

The USEPA (1999b) nationwide database on total mercury concentrations in fish tissue contains information on mercury concentrations in fish tissue in Illinois. Most of the samples collected in Illinois are composites of 2 to 5 fish fillets of several species collected in various lakes and rivers in the upper Mississippi River basin from 1990 to 1993. A total of 85 samples were collected in these lakes and rivers. For the fish species in water bodies in the upper Mississippi River basin in Illinois, the concentration of total mercury in composite fillets ranged from less than 0.010 mg/kg (wet weight) to 0.730 mg/kg (wet weight). The minimum concentration (<0.010 mg/kg) was in a composite of 5 channel catfish (*Ictalurus punctatus*) collected from the upper Mississippi River in East Grand Tower, Jackson County. The maximum concentration (0.730 mg/kg) was in a composite of 5 largemouth bass (*Micropterus salmoides*) collected from Cedar Lake near Makanda, Jackson County. It should be noted that there is an active mercury fish advisory for largemouth bass in Cedar Lake.

Fish can have elevated mercury concentrations far from any source of mercury due to aerial deposition from sources such as power plant emissions and emissions from waste to energy plants. For this reason, site-specific mercury concentrations were compared to regional data. Elevated region-wide concentrations of mercury reflect sources that exist outside of the influence of Dead Creek. Weston, USEPA's oversight contractor, does not believe that these region-wide data are appropriate for comparison to the site due to the active fish advisories,

Seventy-one largemouth bass samples are listed in the USEPA's database for Illinois. Most of these are composite samples, however there are seven individual fish samples. The total mercury concentrations in fillets ranged from 0.010 mg/kg (in a composite of 4 fish collected from the Mississippi River in Rock Island County) to 0.730 mg/kg (in a composite of 5 fish from Cedar Lake). In the individual largemouth bass samples, the mercury concentrations ranged from 0.250 mg/kg to 0.460 mg/kg (both ends of the range measured in Chicago).

Therefore, the benchmark concentration of 0.25 mg/kg mercury wet weight is within the range of concentrations detected in fish in the Mississippi River basin in Illinois. The mercury concentrations in Borrow Pit Lake fish that exceed the benchmark concentration may reflect regional conditions and may not necessarily be related to the site.

7.1.2 Measure of effect 1b: COPC concentrations in surface water as compared to applicable water quality criteria for protection of fish and wildlife

Purpose and Rationale. Water concentrations provide a measure of exposure, and water quality criteria indicate levels above which effects may occur. This measure of effect evaluates the potential for water concentrations of COPCs in Dead Creek and the Borrow Pit Lake to cause adverse effects.

Approach: The assessment compares measured concentrations of COPCs in surface water to water quality criteria. Exposure of individual fish and the populations of fish partly depend on the exposure field and the distribution and behavior of the fish. Thus, the area over which water quality criteria are exceeded is an important consideration when evaluating exposure. We evaluate effects with respect to spatial extent and degree to which surface water concentrations exceed water quality criteria.

Evaluation: Tables 7-5 and 7-6 compare surface water concentrations in Creek Section F and the Borrow Pit Lake to Illinois Water Quality Standards, National Recommended Water Quality Criteria (or Ambient Water Quality Criteria (AWQC)), Great Lakes Initiative Tier II values, and other water quality guidelines summarized by Suter and Tsao (1996). For metals, the Illinois standards and AWQC were adjusted for measured water hardness and total metals, as noted in the tables. The analyses were conducted on unfiltered water samples.

Ten metals and dioxin congeners were detected in surface water in Creek Section F. The acute criterion was exceeded for barium in each sample, and the chronic criteria were exceeded in one or two samples for manganese and aluminum.

In the Borrow Pit Lake, 11 metals, ten pesticides, and dioxin congeners were detected in surface water. Acute criteria were exceeded for aluminum and barium in one or two samples. Chronic criteria were exceeded for aluminum, barium, iron, and manganese in each sample.

There were no AWQC or other guidelines available for 2,3,7,8-TCDD based only on toxicity. For three pesticide compounds detected in Borrow Pit Lake surface water (dieldrin, endrin, and heptachlor epoxide), detection limits were greater than standards or criteria in one or two out of three samples.

7.1.3 Measure of effect 1c: Sustainability of benthic macroinvertebrate communities that comprise a prey base

Purpose and Rationale. Benthic macroinvertebrates are an important source of food for many fish species. They experience direct sediment exposures due to their life histories. Exposures that result in reduced abundance, diversity, or biomass of these aquatic macroinvertebrates could indirectly effect fish populations. Further, quantitative studies of benthic macroinvertebrates have a long history of use in water quality studies.

The assessment uses the sediment triad approach as part of a weight-of-evidence analysis to evaluate the sustainability of benthic macroinvertebrate communities in Dead Creek and the Borrow Pit Lake. The sediment triad approach evaluates three elements of a benthic community:

Sediment chemistry measurements;

Field assessment of benthic macroinvertebrates;

Sediment toxicity testing using indicator benthic macroinvertebrates.

## 7.1.3.1 Sediment Chemical Measurements

Concentrations of COPCs in sediment are compared to sediment benchmarks to evaluate whether adverse biological effects to benthic macroinvertebrates could occur. The sediment guidelines used in this assessment are the consensus-based Threshold Effect Concentrations (TECs) and Probable Effects Concentrations (PECs) developed by MacDonald et al. (2000) and the Ontario (Persaud et al., 1993) Lowest Effect Levels (LEL) and Severe Effects Levels (SEL). Sediment concentrations which exceed these benchmarks do not necessarily indicate

that adverse effects to benthic macroinvertebrates have occurred. This risk uses multiple lines of evidence to assess if benthic macroinvertebrates are adversely affected by COPCs.

Tables 7-7 and 7-8 compare sediment concentrations in the Creek Section F and the Borrow Pit Lake to Sediment Quality Guidelines.

In Creek Section F, Probable Effects Concentrations or Severe Effects Levels were exceeded for six metals, cadmium, copper, lead, mercury, nickel, and zinc. Threshold Effects Concentrations were exceeded for these metals and for arsenic, iron, manganese, total PCBs, seven pesticides, and fluoranthene.

In the Borrow Pit Lake, PEC and SEL guidelines were exceeded by manganese and nickel. These metals and arsenic, cadmium, copper, iron, lead, zinc, DDE, total DDT, gamma-BHC, and heptachlor epoxide exceed the TEC and LEL values.

Tables 7-7b and 7-8b compare sediment concentrations in the "industry specific" composite sediment samples from Dead Creek Section F and the Borrow Pit Lake to Sediment Quality Guidelines. The "industry specific" sediment samples were collected from depths of approximately 0 to 12 inches and generally contained higher concentrations than the ecological sediment triad samples collected from depths of 0 to 2 inches. The ecological sediment samples are more representative of current exposures.

In Creek Section F, both PECs/SELs and TEC/LELs were exceeded for copper, zinc, and PCBs in the "industry specific" samples. Copper exceeded PEC/SELs in 15 out of 29 samples and the TEC/LEL in 22 out of 29 samples. Zinc exceeded PEC/SELs in 17 out of 29 samples and the TEC/LEL in 22 out of 29 samples. PCBs exceeded PEC/SELs in 8 out of 29 samples and the TEC/LEL in 17 out of 29 samples.

In Borrow Pit Lake both PECs/SELs and TEC/LELs were exceeded for zinc in the "industry specific" samples. Zinc exceeded the PECs/SELs in one out of eight samples and the TEC/LELs in eight out of eight samples. Copper did not exceed the TEC/LEL in these samples. PCBs were not detected.

In both Borrow Pit Lake and Creek Section F, there is some uncertainty because detection limits for some COPCs were greater than the Sediment Quality Guideline values. These included total PCBs in one sample location in Creek Section F. Other compounds that had detection limits greater than sediment guidelines in one or two out of three sample locations in Creek Section F or Borrow Pit Lake were 4,4,'-DDT, aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, gamma chlordane, and gamma-BHC (lindane).

# 7.1.3.2 Field assessment of benthic macroinvertebrate community

Effects are evaluated by comparing the composition and abundance of benthic macroinvertebrates within Dead Creek and the Borrow Pit Lake at different levels of concentrations of COPCs in sediment. Typically, these data would also be compared to data from a reference area that reflects conditions in water bodies unaffected by site COPCs. At the direction of the regulatory agencies, and after the ecological risk assessment was completed, these comparisons were eliminated because agreement was not reached over the appropriateness of the reference areas. However, since data were collected from the reference areas, they are presented here, but no comparison with site data is made.

Several metrics described by Barbour et al. (1999) were employed to discern the status of the benthic macroinvertebrate community in Creek Sector F, the Borrow Pit Lake, and the reference locations (PDC-1, PDC-2, Ref 2-1, and Ref 2-2). These metrics addressed the richness, evenness, and composition of the benthic community as well as the tolerance of each taxon to perturbation.

Samples for benthic community analysis were co-located with sediment sampling locations for chemical analysis and samples for sediment toxicity testing. The results and the data summary table are in Appendix D.

Seven metrics were used to assess the benthic community at each station. The number of organisms, the number of taxa, and the three dominant taxa at each station are presented in Table 7-9. The number of taxa was used as a simple measure of richness. Dominant taxa was used as a simple measure of evenness. Three indices were used to measure diversity in terms of heterogeneity at each station, the Shannon-Weaver Index (H'), relative H', and Simpson's Index  $(\lambda)$ . The results of these indices are in Table 7-10. The relative H' index is a comparison of actual diversity to maximum diversity (H'/H'<sub>max</sub>), where maximum diversity is defined as equal abundance among all taxa. Simpson's Index expresses the probability that two randomly sampled benthic organisms will belong to the same taxa and is a measure of heterogeneity of the benthic community. The composition (Table 7-11) of the benthic community was measured by assessing the relative abundance of six major taxonomic groups (Chironomids, Oligochaetes, Non-chironomid insects, Mollusks, Crustaceans, and Other). A version of Hilsenhoff's Biotic Index of Organic Stream Pollution (Hilsenhoff, 1987), modified to include all benthic macroinvertebrates (Table 7-12), was employed to measure the degree of benthic community impairment based on the tolerance to perturbation of the benthic macroinvertebrates. Data on tolerance were taken from Barbour et al. (1999). Abundance of functional feeding groups (FFG) was also looked at as an additional measure of community impairment and is summarized in Figure 7-1. Data on functional feeding groups were taken from Barbour et al. (1999).

In terms of the number of taxa, dominant taxa, and taxonomic group abundance (Table 7-9), the benthic community from each of the sampling locations resembles the benthic community

in deep portions of an eutrophic lake. This community composition reflects the available habitat, as samples were taken from the littoral zones of lentic bodies (Borrow Pit Lake) and the low order stream habitats of Dead Creek Section F. A typical profundal benthic community consists of a low number of taxa dominated by chironomids, oligochaetes and other organisms which are tolerant to low dissolved oxygen concentrations. The benthic community is most likely due to the conditions (e.g., silty substrate, low dissolved oxygen, etc.) in these locations.

Compared to the Borrow Pit Lake, the benthic community in Creek Sector F reflects a more diverse habitat: a closed canopy, relatively heterogeneous substrate, and higher water level. Overall, effects on the benthic community associated with low water levels and high water temperatures are seen in each location. The organically rich sediments of the sampling locations can exacerbate the effects of low water and high temperatures by decreasing already low dissolved oxygen concentrations in the surface water. Concentrations of total organic carbon (TOC) ranged from 12,000 to 84,000 mg/kg dry weight (Appendix A-2). Secondary effects on the benthic community include high homogeneity of substrate (no riffles), silty and very soft sediment, and little to no aquatic macrophytic growth. These are all evident in Dead Creek and the Borrow Pit Lake.

The indices of diversity (H', H'max, and Shannon's) indicate that some locations (i.e., BP-1 and Creek Sector F-1) have a relatively diverse benthic community (Table 7-10). The low number of taxa and the low number of organisms seen in each location, however, overshadow these results (Table 7-11).

According to the modified Hilsenhoff's Biotic Index (Table 7-12), that gives a value to the community structure based on the degree of impairment, the stations in Creek Sector F and the Borrow Pit Lake range from significantly impaired to severely impaired.

Functional Feeding Groups were summarized to assess the community structure (Figure 7-1). Generalists, such as gather/collectors and omnivores, are the dominant functional feeding groups in nearly all stations. This is a reflection of the conditions in the Creek and Borrow Pit Lake, as generalists are considered more tolerant than specialists such as scrapers and shredders. The abundance of predators is proportionately high in stations F-2 and BP-1. Most of the predators in F-2 were ceratopogonids (biting midges; Order diptera). The predators of BP-1 were a diverse group consisting mainly of odonates (dragon and damselflies) and two species of the Order hemiptera.

The only historical information identified for the region is a survey of fourteen streams in the American Bottoms Basin conducted in the spring and summer of 1984 by the IEPA Division of Water Pollution Control (IEPA, 1989). This survey assessed water quality, macroinvertebrates, fish populations, and sediment and fish fillet chemistry. Biological stream characterization and aquatic life use support were also addressed.

Of the fourteen streams surveyed in 1984, six were reported at zero 7-day, 10-year low flow, including Prairie DuPont Creek. An additional six streams were reported at non-zero 7-day, 10-year low flow.

Dead Creek and Borrow Pit Lake are located within the mid-section of the American Bottoms Basin. This part of the basin was considered to be most adversely affected, primarily by industry and urban development in the 1984 study. Within this part of the basin, degradation was greatest in the East St. Louis area. Characterization of streams within the mid-American Bottoms Basin show that low to extremely low dissolved oxygen concentrations and elevated total suspended solids, total dissolved solids, turbidity, total phosphorus, and metals are common. Out of the entire American Bottoms Basin, streams in mid-Basin exhibit the greatest impact on macroinvertebrates and are considered moderate to limited aquatic resources.

The benthic community in Dead Creek Sector F and the Borrow Pit Lake reflect the available habitat. The community is neither diverse nor abundant due to physical conditions (i.e., low water levels, low dissolved oxygen, and silty substrate). This is consistent with observations made by IEPA in 1984.

# 7.1.3.3 Sediment toxicity testing

The assessment uses laboratory sediment bioassays conducted on sediments from Dead Creek and the Borrow Pit Lake to evaluate the potential effects of whole sediment on representative benthic macroinvertebrates (amphipods and chironomid larvae). The sediment used in the sediment bioassays were collected with the samples for chemical analysis and benthic invertebrate enumeration. Except for VOCs, the chemical sample was subsampled from the sediment collected for toxicity testing. VOC samples were collected directly from the sediment to minimize loss due to volatilization.

The toxicity of the sediment is compared to that of the standard control sediment used by the laboratory as part of the laboratory's standard operating procedures. In samples where the sediment was found to be acutely toxic, chronic toxicity tests were not performed. The laboratory testing reports are in Appendix E.

The amphipod bioassays do not suggest toxicity in Dead Creek Section F and little toxicity in Borrow Pit Lake sediments, while the chironomid bioassays do suggest toxicity in both locations. Toxicity bioassays are complex and can contain a high degree of variability in their results. These data suggest that site sediments may be toxic to some organisms. The agent causing the toxicity is unknown.

## Hyalella azteca (Amphipod) Acute Toxicity

Survival of the amphipod in the 10-day acute toxicity bioassay was high at all stations in Creek Sector F and the Borrow Pit Lake, and reference locations, indicating that sediment was not acutely toxic to *H. azteca*. There were no statistically significant differences in survival between samples and laboratory controls. Growth of the amphipod was statistically lower in stations 1 and 3 in the Borrow Pit Lake. The results of the *H. azteca* acute toxicity bioassay are presented in Table 7-13.

## H. azteca Chronic Toxicity

The results of the 42-day chronic survival, growth, and reproduction toxicity bioassay are presented in Table 7-14. This is a test that is relatively new and there is less experience with its execution and performance as compared to the acute toxicity tests.

The results of the laboratory controls were unexpectedly low. Therefore, in this situation only, the results of the reference locations were used for comparison instead (PDC-1 and PDC-2 for Creek Sector F; PDC-1, PDC-2, and Ref 2-2 for the Borrow Pit Lake. With the exception of one reference station (Ref 2-1), survival, growth, and reproduction were statistically similar to the reference stations, indicating that sediments were not chronically toxic to *H. azteca*.

## Chironomus tentans (Chironomid) Acute Toxicity

Survival of the chironomid larvae in the 10-day acute toxicity bioassay was significantly lower than the laboratory controls in all stations in Creek Sector F, the Borrow Pit Lake, and reference locations. Growth was significantly lower than the laboratory controls in stations F-2, and the reference stations PDC-1, and Ref 2-1. Sediment from Creek Sector-F and stations BP-2, PDC-1, and Ref 2-2 were found to be acutely toxic to *C. tentans* larvae. The results of the *C. tentans* acute toxicity bioassay are presented in Table 7-15.

# C. tentans Chronic Toxicity

The results of the 20-day chronic survival, growth, emergence, and reproduction toxicity bioassay are presented in Table 7-16. Survival, emergence, and reproduction in stations BP-1 and BP-3 in the Borrow Pit Lake were significantly lower than laboratory controls. Emergence and reproduction in reference station PDC-2 were significantly lower than laboratory controls.

## 7.1.3.4 Sediment Triad Evaluation

The three elements of the sediment triad are the sediment chemistry measurements, benthic community evaluation, and sediment toxicity tests. This section uses a weight of evidence

approach to evaluate sediment toxicity using these three measurements. The evaluation is adapted from information presented in Long and Chapman (1985) and Chapman et al. (1987).

Table 7-17 presents a summary of the results of the Sediment Triad measurements. The shaded areas indicate where a measurement indicates a greater likelihood of effects in Dead Creek Section F or Borrow Pit Lake sediment. For the first measurement, sediment chemistry, many COPCs exceeded TECs or LELs in Dead Creek Section F and Borrow Pit Lake sediment. The number of exceedances on site ranged from 6 to 14. Similarly, Dead Creek Section F and Borrow Pit Lake sediment also exceeded PECs or SELs. The number of exceedances of these values, which represent probable effects, was 0 to 6 on site. There were more exceedances of both TECs/LELs and PECs/SELs in Dead Creek Section F sediment samples than in Borrow Pit Lake sediment samples.

The benthic community measures indicated that organisms in Dead Creek Section F and the Borrow Pit Lake reflect the available habitat. Numbers of organisms and numbers of taxa were generally low. The Shannon-Weaver measure of diversity and Simpsons Index (a measure of heterogeneity) indicated that the site samples demonstrated relatively low diversity The modified Hilsenhoff Index values for the Dead Creek Section F and Borrow Pit Lake indicated impairment of the benthic community. These effects may be attributable to poor habitat conditions of low water levels, silty substrate, and low dissolved oxygen.

The results of the sediment toxicity testing indicated that few effects were measured for amphipods, while acute and chronic effects were measured for chironomid larvae. Effects on growth were measured in the acute toxicity tests on amphipods in two Borrow Pit Lake samples. These two samples had the lowest number of exceedances of TEC/LEL and PEC/SEL values. One of these Borrow Pit Lake samples had no COPCs exceeding Probable Effects Levels. Therefore, there does not appear to be a correlation between the measurement of effects on amphipod growth and sediment chemistry in the two Borrow Pit Lake samples where effects on amphipod growth were measured..

Overall, the evaluation indicated that the benthic community at the site is affected by the available habitat. Toxicity effects measured in Borrow Pit Lake did not correlate with sediment chemistry

7.2 Assessment Endpoint 2; Survival, growth, and reproduction of local populations of aquatic wildlife as represented by the mallard duck, great blue heron, muskrat, and river otter

The assessment uses five measures of effects to evaluate risks to aquatic wildlife. The assessment will use exposure models to evaluate different routes of exposure including ingestion of water, sediment and food (plants, benthic macroinvertebrates and fish). This subsection describes these measures of effects.

## 7.2.1 Measure of effect 2a: Wildlife species composition and habitat use

Purpose and Rationale. This measure of effect directly examines the receptors, wildlife, to estimate if they are using Dead Creek and the Borrow Pit Lake. It provides qualitative information on the degree to which local and migratory wildlife use the habitat.

Approach: The assessment documents the habitat use by wildlife in Dead Creek Section F and Borrow Pit Lake. This type of survey is qualitative. Because of the qualitative nature of the observations and the high natural variability that can exist in wildlife populations, direct observations may not reveal effects.

Evaluation: Menzie-Cura & Associates, Inc. made observations of the site in 1996, and made observations of the site and reference areas during the site reconnaissance survey conducted in September 1999 and during sampling in October and November 1999. The information here is also based on research on ecological receptors at the site.

The Dead Creek channel and adjacent riparian communities form a narrow, linear wetland system that passes through suburban Cahokia. Portions of Dead Creek are adjacent to residential and business lots that contain mowed lawns, buildings, driveways, and roads. To a great extent, these areas have been modified so that only relict portions of natural vegetation alliances exist. Furthermore, many areas are also influenced by non-native plant species. Sections of the creek, however, are used by rare species monitored by the Illinois Endangered Species Protection Board. This illustrates that Dead Creek does possess value for wildlife habitat and as a travel corridor.

The portion of Dead Creek Section F included in this assessment flows through riparian woods and shrubs and into the Borrow Pit Lake. The Borrow Pit Lake is the largest non-flowing water body in the area. Its shore is surrounded with mature riparian trees. Based on observations of the Borrow Pit Lake at the end of the growing season in September 1999, very little submerged or emergent vegetation appears to grow in the pond. Photographs of these areas in October 1999 are in Appendix B. At that time, water levels were extremely low and sediment was exposed in large portions of the Borrow Pit Lake. Ducks, herons, and fish were observed in the lake. Fish species observed in the pond include: white crappie, largemouth bass, bluegill sunfish, brown bullhead, yellow bullhead, walleye, drum, silver carp, and gar. Table 7-18 lists fish and wildlife species observed at and near the site during the site visit in 1996 and field sampling in 1999.

During high water conditions, Dead Creek flows from the Borrow Pit Lake into the ditched section of Prairie du Pont Creek. At the confluence of Dead Creek and Prairie du Pont Creek and above it, the ditch shore is vegetated with grasses, herbs, and small shrubs. The flow in the ditch is northwest to Arsenal Island on the Mississippi River. Arsenal Island contains areas of mature riparian woods and agricultural fields. The shoreline of the lower end of the

ditch (referred to on the USGS map as Cahokia Chute) is lined with riparian woods, principally large cottonwoods and willow. Large catfish, wood duck, wading birds, and turtles were observed in the channel. Cahokia Chute forms the eastern border of Arsenal Island. The waterway flows north to south, draining the region northeast of the island. It appears that during times when the Mississippi River is high, the river uses the chute channel to flow around Arsenal Island. Any water from the Dead Creek watershed therefore only flows through the lower half of the Cahokia Chute between the confluence with the ditched Prairie du Pont and the Mississippi River. The remains of a bald eagle nest and congregating wading birds were observed in 1996 at the southern tip of Arsenal Island, where the Chute flows into the Mississippi.

Nine vegetation alliances were identified in the vicinity of Dead Creek based on vegetation, landscape position, and hydrological characteristics. These are: White Ash (Fraxinus americana) – American elm (Ulmus americana) Temporarily Flooded Forest, Eastern Cottonwood (Populus deltoides) Temporarily Flooded Forest, Black Willow (Salix nigra) Temporarily Flooded Forest, Buttonbush (Cephalanthus occidentalis) Semi-permanently Flooded Shrubland, Persicaria—Mixed Forb Temporarily Flooded Herbaceous, Typha Seasonally Flooded Herbaceous, Potamogeton—Ceratophyllum—Elodea Permanently Flooded Herbaceous, Temporary Open Water, and Permanent Open Water. The location and extent of each community is shown on Figure 7-2.

Extensive wetlands occur west of Route 3, particularly in the vicinity of the Borrow Pit Lake. The Creek's wetlands appeared healthy with no evidence of ecological stress (no chlorotic plants, no monospecific stands of vegetation, no areas of dying or dead vegetation, no observed surface water sheens or sediment staining) with the exception of extremely low water levels observed in the Fall of 1999 when portions of Dead Creek and the Borrow Pit Lake dried out completely. The wetlands also appeared to support a diverse aquatic and terrestrial wildlife community, with abundant prey species (i.e., fish, frogs, turtles) and predatory species (i.e., wading birds, waterfowl, raccoons). The wetlands west of Route 3 receive water from both Dead Creek and from drainage areas to the north.

Animal use of the Dead Creek study area is generally limited to species that do not require large tracts of pristine land and can tolerate some level of habitat modification and disturbance. These animals are mostly species that can use residential areas for foraging and/or shelter or are smaller vertebrates that have limited space requirements. The juxtaposition of forest, shrubland, and open water does provide for some landscape diversity. Additionally, the proximity of the site to the Mississippi River and presence of wetlands provide feeding areas for migratory waterfowl and wading birds. The early age of most of the communities (due to disturbance), however, provided limited structural diversity.

Several species of birds were observed using Dead Creek and the adjacent riparian corridor for foraging and roosting. Many of the birds seen were those that frequent residential areas (e.g., American robin, northern cardinal, blue jay, northern mockingbird) and could use the area of

the Dead Creek floodplain for nesting. Carolina wrens, several species of sparrows, and Eurasian tree sparrows were noted using dense shrub and liana thickets. European starlings were seen roosting in large flocks in the larger trees along Dead Creek. Limited use of the open water sections by waterfowl and wading birds does occur. These open water areas of Dead Creek are likely also used during the breeding season for feeding by swallows, phoebes, and flycatchers. On two occasions, a great horned owl was seen in or near the study area. Bird species known or likely to occur in the Dead Creek study area are presented in Table 7-18.

Mammals using Dead Creek habitats were primarily rodents, small omnivores, and likely bats and insectivores (i.e., shrews). Eastern chipmunks and gray squirrels were seen frequently during the surveys. Raccoon tracks were found nearly everywhere the ground surface was conducive to track formation. The only large mammal documented in the study area was white-tailed deer. Numerous tracks were observed of this species. Mammal species known or likely to occur in the Dead Creek study area are presented in Table 7-18.

Few amphibian and reptiles (collectively called herpetiles) were observed in the vicinity of Dead Creek. However, the stream channel and adjacent riparian forest provide habitat for a number of species that can occur in small, somewhat disturbed, water bodies. Animals that are ubiquitous in many wetland types in the United States, such as bullfrogs, northern cricket frogs, painted turtles, red-eared sliders, and common garter snakes, are expected to use Dead Creek for feeding and shelter. Herpetile species known or likely to occur in the Dead Creek study area are presented in Table 7-18.

Though Illinois has a rich fish fauna, it was expected that few species would be found in Dead Creek. Due to blocked drainages and elevated culverts, much of the upper Dead Creek functions more as a series of linear, shallow ponds rather than a flowing stream course. Therefore, during much of the year, it would be difficult for fish to move through the watershed to escape declining water levels or other stressful conditions (e.g., high water temperature, low dissolved oxygen, avian predators). Furthermore, Dead Creek generally possessed turbid water and had a soft bottom, eliminating species that require clear water and firm substrate. No fish were observed in Dead Creek Section F. However, a large variety of fish species were present in Borrow Pit Lake. Fish observed in Dead Creek and Borrow Pit Lake are in Table 7-18.

Habitat Known to be Used by Federal Designated or Proposed Endangered or Threatened Species

According to the records of the Illinois Department of Natural Resources' Natural Heritage Inventory, the only federally endangered or threatened species in the study area is the federally threatened bald eagle (*Haliaeetus leucocephalus*). In 1993, a pair of eagles unsuccessfully attempted to nest at the southern tip of Arsenal Island, where the ditched portion of Prairie du

Pont Creek enters the Mississippi River. The pair apparently was scared off the site based on the unsuccessful nesting attempt. The next year the pair returned to the island, but no monitoring was conducted to determine if they successfully nested. The nest has since blown down and no other nests have been constructed on the island.

Portions of the area suitable for eagle foraging include waterbodies large enough to support large fish such as carp and catfish. The Mississippi River, the channelized section of Prairie du Pont Creek, and the Borrow Pit Lake appear to support large fish and provide enough open water for eagles to fish. Two bald eagles were observed by USEPA and Illinois EPA representatives approximately 1 mile west of Dead Creek Section B and 0.5 miles east of the Mississippi River in late 1999. A bald eagle was also observed in the same location in December 2000.

The US Fish and Wildlife Service Region 3 (USFWS, 2001) also lists the Indiana bat (Myotis sodalis), and the Illinois cave amphipod (Gammarus acherondytes) as federally-listed endangered species and the plant Decurrent false aster (Boltonia decurrens) as a federally-listed threatened species potentially present in the vicinity of the site (St. Clair, Illinois). The Indiana bat requires a habitat of small stream corridors with well developed riparian woods and nearby upland forest. The wooded areas around Dead Creek and the Borrow Pit Lake are not well developed due to nearby residential and agricultural uses, and therefore, do not provide good habitat for the Indiana bat. The Illinois cave amphipod is listed for St. Clair county, but exists in cave streams in Illinois sinkhole plains, a habitat not present on the site. The Decurrent false aster is present in disturbed alluvial soils in the Mississippi River floodplain, and could be present at the site, although none was observed there.

Habitat Known to be Used by State Designated Endangered or Threatened Species

The Illinois Natural Heritage Inventory did not have any records of state-listed endangered or threatened species in the study area. However a number of state-listed wading birds were observed throughout the wetlands and waterways. Illinois endangered species observed were little blue heron (Egretta caerulea), snowy egret (Egretta thula), and black-crowned night heron (Nycticorax nycticorax). Great egret (Casmerodius albus), an Illinois threatened species, was also observed. Small numbers (one to ten individuals) of these wading birds were found foraging along sections of Dead Creek, the ditched length of Prairie du Pont Creek, Cahokia Chute, and the Mississippi River. The largest concentrations of foraging herons (approximately ten individuals at a location) were observed at the confluence of Dead Creek and the ditched Prairie du Pont Creek, and where the ditched Prairie du Pont flows into the Mississippi. These areas likely support the best concentrated fishing areas for wildlife along the waterways.

No wading bird colonies were located within the study area. However, the Illinois Natural Heritage Inventory has documented two 1000-2000 nest mixed-species colonies in East St. Louis. The closest of these two colonies is approximately one mile east of Sauget Area I near the Alton & Southern rail yards in Alorton. The second site is over two miles to the north at Audubon Avenue and 26th Street. These two colonies contain the only breeding little blue heron and snowy egret in Illinois. In addition, black-crowned night heron, great egret, cattle egret (Bubulcus ibis), great blue heron (Ardea herodias), and green-backed heron (Butorides virescens) nest in the colonies.

In 1988, because the region is heavily industrialized with numerous Superfund sites, the U.S. Fish & Wildlife Service (USFWS) collected black-crowned night heron and little blue heron eggs from the Alorton colony for contaminant analysis (Young, 1989 - unpublished draft). Sediment samples were also taken in areas of observed wading bird foraging around the East St. Louis region. No testing was done of sediments in the Dead Creek drainage. Polychlorinated biphenyls (PCBs), DDE, and metals were detected at varying levels in the wading bird eggs.

The observed endangered and threatened wading birds forage on a wide range of aquatic organisms, such as fish, frogs, and crayfish, as well as some terrestrial species such as reptiles and insects. The USFWS study found that wading birds forage over a wide area around East St. Louis. The Dead Creek Prairie du Pont wetlands system composes a relatively small percentage of the available wetland foraging area in the region.

Also observed in the vicinity of Dead Creek were a Illinois-listed threatened bird species, the brown creeper (Serthia americana) and a rare grass species, early wild-rye (Elymus macregorii).

The brown creeper is a small, brown-streaked bird related to nuthatches that occurs throughout most of the United States and southern Canada. As its name implies, it forages by moving closely over the stem and main branches of trees. Its diet is comprised largely of insects, though some seeds and nuts are eaten as well (Ehrlich et al., 1988). This bird commonly nests in conifer, mixed conifer-hardwood, or hydric forests. Special habitat requirements include standing dead trees with loose bark for feeding and trees greater than 25 cm in diameter for nesting (Thomas et al., 1979). This species was heard singing in November 2000 from Dead Creek Section B. The general Dead Creek area possesses a few, very large diameter, standing dead trees. It is likely that brown creeper use of the Dead Creek area is minor due to limited intact forest and the young age of most trees.

Early wild-rye is a recently described species belongs to a group of taxonomically challenging grasses. Early wild-rye possesses a single spike of congested flowers tipped by long bristles. It occurs primarily in rich forests and floodplains in eastern United States and has been documented from five counties in Illinois (e.g., Fulton, Jersey, Knox, Peoria, Union) based on review of museum specimens performed by Campbell (in ed.). Because this species occurs in

floodplain forests, a community that has largely been converted to agricultural land in Illinois, this species may be extirpated from portions of the state. Though this species is not formally listed by the Illinois Endangered Species Protection Board, early wild-rye appears to be rare in the state and information on its occurrence is being supplied in the event it becomes a state-tracked species. The only occurrence of this grass in the Dead Creek study area was from a White Ash – American Elm Temporarily Flooded Forest on the east bank of Dead Creek Section C. The plants were limited to a small area (2 m²) and were senescent with dispersing fruits at the time of observation. Poison ivy, trumpet-creeper, white snakeroot, rough-leaved dogwood, and black raspberry were associated species.

Reference Areas: Reference area 1 was a section of Old Prairie du Pont Creek near the town of East Carondelet, approximately 3 miles southwest of the end of Dead Creek in the Borrow Pit Lake. This section of Old Prairie du Pont Creek is a broad shallow water body with a mud substrate similar to the Borrow Pit Lake. It is distant from any influence from the site or other industrial areas, but is similar to the Borrow Pit Lake in that it is near agricultural land. It is also similar to the Borrow Pit Lake in that it has a narrow riparian zone but little to no emergent or submerged vegetation. Great and/or snowy egret were observed in this area. It supports a similar fish community to the Borrow Pit Lake. Many of the same species of fish (brown bullhead, crappie, bluegill sunfish, largemouth bass) and invertebrates (clams and shrimp) were present in this reference area.

Two bodies of water in Monroe County comprise reference area 2 and were selected during the main sampling event. These water bodies were approximately 20 miles south of Dead Creek. Reference area 2-1 was in Long Slash Creek north of the culvert where Merrimac Road crosses the creek. This section was similar to Dead Creek sectors B through E in that it was shallow and muddy. It was also similar to these areas (but not Creek Section F) in that it had a road crossing and agricultural fields coming down to the water's edge. There was evidence of beaver activity at the culvert under the road crossing. Biota present in this area included creeping buttercup and snails. Reference area 2-2 was a flooded borrow pit north of Fountain Creek. Reference area 2-2 had a muddy substrate and similar fish community to the Borrow Pit Lake. Surrounding vegetation consists of a thin riparian zone similar to Reference Area 1. The same fish and invertebrate species were found at this reference area as well.

Conclusions: During the various field surveys and contact with state and federal agencies, three categories of sensitive environments were identified in the Dead Creek area: Habitat Known to be Used by Federal Designated or Proposed Endangered or Threatened Species, Habitat Known to be Used by State Designated Endangered or Threatened Species, and Wetlands. The state-listed endangered and threatened species observed on site (herons and

egrets) forage over a wide area, with the Dead Creek watershed forming only a small part of their available feeding territory. The brown creeper makes only minor use of the Dead Creek area because the habitat is not suitable (not enough mature trees).

The Dead Creek watershed also appears to support a diverse plant and animal community. While much of the creek flows through residential neighborhoods, sufficient natural riparian vegetation remains to support local aquatic and terrestrial communities. The ecological stresses observed (lack of emergent or submerged vegetation, impaired benthic invertebrate community) are due to poor habitat conditions including low water levels, silty substrate, and low dissolved oxygen concentrations. No other evidence of ecological stress was evident in Dead Creek or the Borrow Pit Lake. Birds and wildlife species are abundant and making use of the habitat.

# 7.2.2 Measure of effect 2b: Concentrations of COPCs in aquatic and marsh plants

Purpose and Rationale. The assessment discusses concentrations of COPCs in creeping buttercup in Dead Creek Section F. No submerged or emergent aquatic vegetation was present in the Borrow Pit Lake. Therefore, during the site reconnaissance, creeping buttercup was selected as a plant species that could be grazed upon by waterfowl and herbivorous mammals and that was present in most sections of Dead Creek. This species of plant has a fleshy stem, but a tiny root system. Therefore, the entire plant was analyzed for COPCs. If plants take up metals and PAHs from the water or sediments, waterfowl and herbivorous mammals could be exposed to these COPCs in their diet.

Approach: The endpoint is evaluated in multi-pathway exposure models for the mallard and the muskrat that consider concentrations of COPCs in sediment, water, and food. Exposures of waterfowl and herbivorous mammals within Dead Creek Section F are compared to appropriate NOAEL and LOAEL values. The COPC concentrations measured in creeping buttercup will be used to evaluate potential dietary exposures of the mallard and muskrat.

Evaluation: Table 7-19 presents maximum and average concentrations of COPCs detected in creeping buttercup samples from Dead Creek Section F. Compounds detected in plants from Dead Creek Section F include the metals aluminum, antimony, arsenic, cadmium, copper, lead, nickel, and zinc, the PAHs acenaphthylene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene, benzo(g,h,i)perelene, indeno(1,2,3-c,d)pyrene, and dibenz(a,h)anthracene, the herbicide dicholoroprop, the pesticides aldrin, gamma chlordane, heptaclor, and dioxins. This indicates that herbivorous wildlife receptors could be exposed to some site COPCs via the food chain.

Concentrations of COPCs detected in plants from Dead Creek Section F were used in food chain models to evaluate potential risks to mallards and muskrat, as representative species of herbivorous wildlife. The details of the food chain model are discussed in Appendix E. Results are summarized in Table 7-20a. The food chain models were run separately with

average and maximum sediment concentrations from the ecological sediment samples and with the average and maximum sediment concentrations from the combined ecological sediment samples and "industry specific" samples.

Food Chain Model Results – ecological sediment samples (0 to 2 inch depth)

#### Muskrat

Using data from the ecological sediment samples, food chain modeling indicated that the average doses of COPCs that muskrats receive from ingesting plants, sediment, and surface water from Dead Creek Section F do not exceed NOAEL or LOAEL concentrations, with the exception of aluminum. The hazard indices for aluminum were 50 and 5 compared to the NOAEL and LOAEL using average concentrations and 70 and 7 using maximum concentrations. Surface water concentrations of aluminum did not contribute appreciably to these hazard indices. Two thirds of the calculated aluminum dose are from sediment and one third is from food (plants). The sediment aluminum concentrations in Dead Creek Section F (7,800 to 17,000 mg/kg) are within the range of Illinois background soil (up to 37,200 mg/kg; IEPA, 1994). Because a muskrat's foraging area is smaller than Creek Section F, the model assumed that a muskrat eats vegetation from Dead Creek Section F year round. This indicates that under current conditions represented by the ecological sediment samples, the site-related exposures of herbivorous mammals are indistinguishable from Illinois background.

#### Mallard

Using data from the ecological sediment samples, food chain modeling for mallards ingesting plants from Dead Creek Section F year round resulted in hazard indices less than 1 compared to NOAEL doses for each COPC using average concentrations and a foraging area of 580 hectares (USEPA, 1993; vs. 0.3 hectares in Dead Creek Section F). Hazard indices were also less than one compared to NOAEL doses using maximum concentrations and assuming the mallard feeds only in Dead Creek Section F. This indicates that waterfowl that ingest plants from Dead Creek Section F under current conditions represented by the ecological sediment samples are not at risk from COPCs.

Food Chain Model Results - combined ecological and "Industry Specific" sediment samples

#### Muskrat

Using the average or maximum data from the combined ecological and "industry specific" sediment samples, average doses of copper, zinc, and PCBs that muskrats receive from ingesting plants, sediment, and surface water from Dead Creek Section F do not exceed NOAEL or LOAEL concentrations. The exposure concentrations for the remaining COPCs were the same as described above for the ecological sediment samples (hazard indices for aluminum greater than 1 based on background aluminum concentrations in sediment).

#### Mallard

When the data from the combined ecological and "industry specific" sediment samples are used in the food chain model for mallards that ingest plants in Dead Creek Section F, hazard indices for copper, zinc, and PCBs do not exceed one. However, when maximum sediment concentrations are used from these samples, hazard indices exceed one for zinc for the NOAEL but not the LOAEL dose. This indicates that under the most conservative assumptions, zinc in deeper Dead Creek Section F sediments could pose a potential risk to mallards. The deeper sediments do not represent current exposure conditions, and would only pose this potential risk if exposed by a scour event. The exposure concentrations for the remaining COPCs were the same as described above for the ecological sediment samples (hazard indices less than 1).

# 7.2.3 Measure of effect 2c: Concentration of COPCs in surface waters

Purpose and Rationale. Many wildlife species will use Dead Creek and associated wetlands as a drinking water source. The presence of COPCs in water could be a source of exposure to these species. This measure of effect examines this potential route of exposure.

Approach: This endpoint is evaluated by two methods. Concentrations of COPCs in surface water are compared to drinking water values for wildlife developed by Sample et al. (1996). In addition, surface water concentrations are used in multi-pathway exposure models for wildlife that develop exposure doses based on concentrations in sediment, water, and food.

Evaluation: Surface water concentrations of COPCs in Dead Creek were compared to drinking water no observed adverse effects levels (NOAEL) and lowest observed adverse effects levels (LOAEL) developed by Sample et al. (1996). Tables 7-21 and 7-22 summarize these comparisons for Dead Creek Section F and the Borrow Pit Lake. For each compound, the lowest NOAEL values for water were used as benchmarks. In Creek Section F and the Borrow Pit Lake, surface water concentrations do not exceed any of the wildlife benchmarks. Note that there is no benchmark available for some constituents.

The results of food chain modeling are in Appendix E. In each of the food chain models, average and maximum surface water concentrations from Dead Creek Section F and the Borrow Pit Lake did not result in a potential risk to wildlife. Surface water concentrations contributed a minor portion to the hazard indices for each COPC.

# 7.2.4 Measure of effect 2d: Concentration of COPCs in fish

Purpose and Rationale: Some wildlife species such as the great blue heron and river otter eat primarily fish. This measure of effect evaluates this potential route of exposure.

Approach: The COPC levels measured in fish are used in the multi-pathway exposure model for the great blue heron and river otter that incorporate concentrations in sediment, water, and food. Exposures of the great blue heron and river otter within Dead Creek and the Borrow Pit Lake are compared to appropriate NOAEL and LOAEL values. Because plants were the only biota collected in Dead Creek Section F (few minnows were present in this section of Dead Creek and were not abundant enough to collect), concentrations of COPCs in fish were modeled for this area using site-specific bioaccumulation factors (BAFs). The details of how these BAFs were calculated are presented in Appendix G.

# 7.2.4.1 Evaluation of Measured Fish Concentrations

Evaluation: Tables 7-1, 7-2, and 7-3 present maximum and average concentrations of COPCs detected in largemouth bass, brown bullhead, and forage fish, respectively, from the Borrow Pit Lake.

Concentrations of COPCs detected in fish the Borrow Pit Lake were used in food chain models to evaluate potential risks to great blue herons and river otter, as representative species of piscivorous wildlife. The details of the food chain model are discussed in Appendix E. Results are summarized in Table 7-20b.

Food Chain Model Results – ecological sediment samples (0 to 2 inch depth)

#### River Otter

For the river otter eating a diet of large and small fish (72% "large fish" such as largemouth bass or brown bullhead and 28% forage fish, based on information in USEPA (1993)) from the Borrow Pit Lake, average concentrations of COPCs in fish tissue, ecological sediment samples, and surface water resulted in hazard indices less than 1 compared to the NOAEL dose. This model used average concentrations of COPCs to represent an otter integrating exposure from different species of fish consumed and different locations within the Borrow Pit Lake. It also assumes that the Borrow Pit Lake comprises approximately 0.01 of a river otter's foraging area (5 hectares of the Borrow Pit Lake/400 hectare foraging area (USEPA, 1993). When maximum concentrations were used and the river otter was assumed to forage only in the Borrow Pit Lake, hazard indices exceeded 1 for aluminum and mercury. Two thirds of the river otter's aluminum dose comes from sediment, and aluminum concentrations in Borrow Pit Lake sediment are within Illinois background for soil (4,000 to 16,000 mg/kg in

the Borrow Pit vs. up to 37,200 mg/kg in Illinois background soil; IEPA, 1994). Mercury concentrations in sediment were similar in the Borrow Pit Lake are also within background (0.10 to 0.16 mg/kg at the Borrow Pit compared to up to 0.99 mg/kg in Illinois background soil (IEPA, 1994). This conservative maximum assessment places an upper bound on potential risk, but does not imply risk to piscivorous mammals at the Borrow Pit Lake.

Food Chain Model Results - combined ecological and "industry specific" sediment samples

#### River Otter

Using average and maximum concentrations of copper, zinc, and PCBs from the "industry specific" sediment samples did not result in hazard indices greater than one for the river otter ingesting fish, sediment, and surface water. Exposure point concentrations for the remaining COPCs were the same as discussed above for the ecological sediment samples (hazard indices above 1 for aluminum and mercury only for the most conservative case restricting the river otter's foraging area to the Borrow Pit Lake).

### Food Chain Model Results - great blue heron

For the great blue heron, the food chain model using average concentrations of COPCs in small (73% forage fish) and large fish (27% "large" fish such as largemouth bass and brown bullhead based on information in USEPA (1993)) and surface water, the hazard index for mercury compared to the NOAEL dose was 4. The hazard index compared to the LOAEL dose was 0.4. The hazard indices for the rest of the COPCs were less than 1 compared to the NOAEL dose. This model also assumed that great blue heron were foraging onsite from early March to late November (Illinois, 2000) and that a heron's foraging area is approximately the size of the Borrow Pit Lake (a foraging area of 0.6 to 8.4 hectares as reported in USEPA (1993) compared to 4.9 hectares of the Borrow Pit Lake). When a larger foraging area was used (3-mile radius that is likely to be more representative of herons known to nest in the area (East St. Louis and Alorton, Illinois), hazard indices compared to the NOAEL dose were less than 1. When maximum concentrations were used in the model and the herons were assumed to forage on site year round, only mercury had a hazard index greater than one compared to the NOAEL dose, but not the LOAEL dose. These hazard indices greater than one for mercury are due to concentrations in brown bullhead and small minnows. This indicates some potential risk to piscivorous birds due to mercury in fish tissue at the Borrow Pit Lake. The potential risk may be indistinguishable from regional conditions, as concentrations of mercury in Borrow Pit Lake fish were within the range of concentrations detected in Illinois fish.

# 7.2.4.2 Evaluation of Modeled Fish Concentrations in Dead Creek Section F

Modeled average concentrations of COPCs in fish in Dead Creek Section F were used in food chain models to evaluate potential risks to great blue herons and river otter, as representative species of piscivorous wildlife. The methods used to model the fish concentrations are

presented in Appendix G. The details of the food chain model are discussed in Appendix F. Results are summarized in Table 7-20a.

Food Chain Results - river otter

For the river otter eating a diet of fish (modeled based on forage fish concentrations) and also ingesting surface water and sediment, hazard indices are less than one compared to NOAEL doses. Therefore, river otter consuming fish from Dead Creek Section F would not be at risk.

Food Chain Model Results – great blue heron

For the great blue heron, the food chain model using average modeled concentrations of COPCs in fish and measured surface water concentrations, the hazard index for mercury is one and the hazard indices for the remaining COPCs are less than one compared to NOAEL doses. This indicates that great blue heron would not be at risk from consuming fish in this area.

# 7.2.5 Measure of effect 2e: Concentration of COPCs in benthic macroinvertebrates

Purpose and Rationale. Waterfowl (such as the mallard) and mammals (such as the muskrat and river otter) eat benthic macroinvertebrates as a portion of their diet. This measure of effect evaluates this potential route of exposure.

Approach: The COPC levels measured in benthic macroinvertebrates are used in a multipathway exposure model for the mallard, muskrat, and river otter that incorporates concentrations in sediment, water, and food. Exposures of waterfowl and mammals within Dead Creek and the Borrow Pit Lake are compared to appropriate NOAEL and LOAEL values. Because plants were the only biota detected in Dead Creek Section F, concentrations of COPCs in macroinvertebrates were modeled for this area using site-specific bioaccumulation factors (BAFs). The details of how these BAFs were calculated are presented in Appendix G. In addition, a combination of literature values and site specific BAFs were used to model concentrations of COPCs in aquatic insects (Appendix G). These modeled concentrations were used to evaluate potential risk to three swallows.

# 7.2.5.1 Evaluation of Measured Macroinvertebrate Concentrations

Evaluation: Tables 7-22 and 7-23 present maximum and average concentrations of COPCs detected in shrimp and clams, respectively, from the Borrow Pit Lake. Only one composite shrimp sample was collected from the Borrow Pit Lake. Pentachlorophenol, aluminum, antimony, chromium, copper, lead, silver, zinc, diethyl phthalate, and dioxins were detected in this sample. The clam samples from Borrow Pit Lake contained dichloroprop, MCPP, aluminum, arsenic, cadmium, chromium, copper, lead, silver, zinc, heptachlor, methorychlor, two phthalates, and dioxin.

Concentrations of COPCs detected in shrimp from the Borrow Pit Lake were used in food chain models to evaluate potential risks to mallards; concentrations detected in clams were used to evaluate potential risks to muskrat and river otter. The details of the food chain model are discussed in Appendix E. Results are summarized in Table 7-20b.

Food Chain Model Results – ecological sediment samples (0 to 2 inch depth)

# Muskrats feeding on clams

Food chain modeling indicated that the average doses of COPCs that muskrats receive from ingesting clams, sediment from ecological sediment samples (0 to 2 inches), and surface water from the Borrow Pit Lake do not exceed NOAEL or LOAEL concentrations, with the exception of aluminum. Approximately 80% of the muskrat's aluminum dose is from sediment, and the sediment concentration in the Borrow Pit Lake is within Illinois background for soil. The hazard indices for aluminum were 40 and 4 compared to the NOAEL and LOAEL using average concentrations and 50 and 5 using maximum concentrations. Surface water concentrations of aluminum did not contribute appreciably to these hazard indices.

#### River otter feeding on clams

For the river otter eating clams from the Borrow Pit Lake, average concentrations of COPCs in clam tissue, surface sediment (represented by the ecological sediment samples), and surface water resulted in hazard indices less than 1 compared to a NOAEL dose. This model used average concentrations of COPCs to represent an otter integrating exposure different locations within the Borrow Pit Lake. It also assumes that the Borrow Pit Lake comprises approximately 0.01 of a river otter's foraging area. When maximum concentrations were used and the river otter was assumed to forage only in the Borrow Pit Lake, the hazard index exceeded 1 for aluminum. Approximately 80% of the river otter's dose of aluminum is due to sediment, and the sediment concentrations of aluminum in Borrow Pit Lake is within the range of background for Illinois soil.

# Mallards feeding on shrimp

Food chain modeling for mallards that eat shrimp from Dead Creek Section F resulted in hazard indices less than 1 compared to the NOAEL dose for each COPC using both average and maximum concentrations for shrimp, surface water, and surface (ecological) sediment samples.

Food Chain Model Results - combined ecological and "industry specific sediment samples

# Muskrats feeding on clams

For muskrats feeding on clams, when average and maximum concentrations from the combined ecological and "industry specific" sediment samples from Borrow Pit Lake are used, hazard indices for copper, zinc, and PCBs do not exceed one compared to a NOAEL dose. Exposure point concentrations for the remaining COPCs are the same as for the ecological sediment samples discussed above. Only aluminum has a hazard index above 1 due mostly to sediment concentrations within the background range for Illinois soil.

### River otter feeding on clams

For river otter feeding on clams, when average and maximum concentrations from combined ecological and "industry specific" sediment samples from Borrow Pit Lake are used, hazard indices for copper, zinc, and PCBs do not exceed one compared to a NOAEL dose. Exposure point concentrations and hazard indices for the remaining COPCs are the same as for the ecological sediment samples described above (only aluminum has a hazard index above 1 for the most conservative case restricting the river otter's foraging to the Borrow Pit Lake).

# Mallards feeding on shrimp

Food chain modeling for mallards that eat shrimp from Dead Creek Section F resulted in hazard indices less than 1 compared to the NOAEL doses for each COPC using both average and maximum for shrimp, surface water, and combined ecological and "industry specific" sediment samples.

The results of the food chain modeling indicate that wildlife that consume macroinvertebrates (clams and shrimp) from the Borrow Pit Lake are not at risk. The exposure of some wildlife to aluminum above a NOAEL or LOAEL dose is represents background conditions.

# 7.2.5.2 Evaluation of Modeled Macroinvertebrate Concentrations in Dead Creek Section F and the Borrow Pit

Modeled average concentrations of COPCs in snails in Dead Creek Section F were used in food chain models to evaluate potential risks to mallards and muskrat. Modeled average concentrations of COPCs in aquatic insects in Dead Creek Section F and the Borrow Pit Lake were used in a food chain model to evaluate potential risks to tree swallows. The methods used to model the snail and insect concentrations are presented in Appendix G. The details of the food chain model are discussed in Appendix F. Results are summarized in Tables 7-20a and 7-20b.

# Mallard feeding on snails in Creek Section F

For the mallard ingesting snails, surface water and sediment, hazard indices are less than one compared to NOAEL doses. Therefore, mallards consuming snails from Dead Creek Section F would not be at risk.

# Muskrat feeding on snails in Creek Section F

For the muskrat in Dead Creek Section F, the food chain model using average modeled concentrations of COPCs in macroinvertebrates and measured surface water and sediment concentrations, hazard indices exceed one for aluminum, antimony, copper, and dioxins. The modeled doses exceed the NOAEL dose but not the LOAEL dose for antimony and dioxin. The modeled doses exceed the LOAEL dose for aluminum and copper. This indicates a potential risk for muskrats foraging for macroinvertebrates in Dead Creek Section F.

# Tree swallow feeding on aquatic insects in Creek Section F

For a tree swallow that feeds on aquatic insects (concentrations modeled from ecological sediment samples and from combined ecological and "industry specific" sediment samples) in Creek Section F, hazard indices exceed one for aluminum, cadmium, chromium, mercury, zinc, Total PCBs, Total DDT, and dioxin compared to a NOAEL dose. Hazard indices exceed 1 for mercury and Total PCBs compared to a LOAEL dose.

# Tree swallow feeding on aquatic insects in the Borrow Pit Lake

The modeling results for a tree swallow the feeds on aquatic insects in the Borrow Pit Lake indicate that hazard indices are greater than one for aluminum, chromium, mercury, zinc, Total DDT, and dioxin when insect concentrations are modeled from the concentrations in the ecological sediment samples (0 to 2 inch depth). These hazard indices indicate that exposure exceeds the NOAEL, but not the LOAEL dose. When the insect concentrations are modeled from the concentrations from the combined ecological and "industry specific" sediment samples, hazard indices exceed one compared to the NOAEL dose, but not the LOAEL dose for aluminum, chromium, mercury, zinc, Total PCBs, Total DDT, and dioxin. The hazard index for PCBs also exceeds the LOAEL dose.

# 7.3 Assessment Endpoint 3: Survival, growth, and reproduction of individuals within the local bald eagle population that may overwinter near the site

The assessment uses an exposure model to evaluate different routes of exposure including ingestion of water, sediment and fish.

7.3.1 Measure of effect 3a: Concentration of COPCs in fish for use in evaluating exposure via the food chain

Purpose and Rationale. Bald eagle may use fish in Dead Creek and associated wetlands as food. The presence of COPCs in fish could be a source of exposure to this species. This measure of effect examines this potential route of exposure.

Approach: This endpoint is evaluated via an exposure model for the bald eagle. The assessment compare exposures to) appropriate NOAEL and LOAEL values.

Evaluation: Tables 7-2 and 7-3 present maximum and average concentrations of COPCs detected in largemouth bass and brown bullhead, respectively, from the Borrow Pit Lake.

As stated in Section 7.2.4, some COPCs were detected in largemouth bass and brown bullhead samples from the Borrow Pit Lake.

Concentrations of COPCs detected in fish from the Borrow Pit Lake were used in food chain models to evaluate potential risks to the bald eagle. The details of the food chain model are discussed in Appendix F. Results are summarized in Table 7-20b.

Food Chain Model Results - measured fish concentrations in Borrow Pit Lake

The food chain model for the bald eagle using average concentrations in large fish and surface water did not result in hazard indices for any COPC greater than 1 compared to the NOAEL dose. This model assumed that eagles overwinter in the vicinity of the site from October through March and that the Borrow Pit Lake comprises about 0.003 of the eagles foraging area (5 hectares vs. 1880 hectares foraging area; USEPA, 1993). Using maximum concentrations in large fish and surface water and assuming that the eagle forages year round and only at the Borrow Pit Lake resulted in a hazard index for mercury of 5 compared to the NOAEL dose. However, even for this conservative case, the estimated exposure dose is still less than the LOAEL value. The maximum mercury concentration in largemouth bass and brown bullhead combined was measured in one composite brown bullhead sample that was approximately 5 times higher than mercury concentrations from other large fish from the Borrow Pit Lake.

Food Chain Model Results - modeled fish concentrations in Creek Section F

An additional evaluation was conducted using modeled average concentrations of COPCs in fish in Dead Creek Section F to evaluate potential risks to bald eagles. The methods used to model the fish concentrations are presented in Appendix G. The details of the food chain model are discussed in Appendix F. Results are summarized in Table 7-20a.

The results predict that hazard indices for the eagle eating fish from Dead Creek Section F are less than one for the NOAEL dose. Therefore, bald eagles consuming fish from Dead Creek Section F would not be at risk.

- 7.4 Assessment Endpoint 4: Survival, growth, and reproduction of local populations of terrestrial wildlife along the banks and floodplain of Dead Creek
- 7.4.1 Measure of effect 4a: COPC concentrations in soil samples from the creek bank and floodplain as compared to applicable soil screening levels for protection of wildlife, plants, and soil dwelling invertebrates

Purpose and Rationale. Soil concentrations provide a measure of exposure, and screening level criteria indicate levels above which effects may occur. This measure of effect evaluates the potential for soil concentrations of COPCs in the Dead Creek floodplain to cause adverse effects.

Approach: The assessment compares measured concentrations of total contaminant concentrations in soils to existing benchmarks as summarized in Efroymson et al. (1997).

These soil benchmarks are developed from values that represent a LOAEL for plants, soil invertebrates, and wildlife (birds and mammals). Efroymson et al. (1997) selected the lowest of the available values as a soil benchmark.

Discussion: Tables 7-25, 7-27 (a through e), and 7-29 (a through d) compare concentrations detected in Dead Creek floodplain soil to soil screening benchmarks and background concentrations. The floodplain soil concentrations are represented by either the maximum concentration detected in or the 95% upper confidence limit (UCL) on the mean. For some areas, there were many more surface soil samples than sediment or surface water samples, and therefore a 95% UCL could be calculated. The background soil concentrations are represented as twice the average background soil concentration. The background data set comes from three soil samples selected during discussions with USEPA regarding development of the Site Sampling Plan workplan for the project. Soil constituents fall into several categories including:

- 1) constituents for which the maximum site concentrations exceed the benchmark (indicated in yellow on the reference tables);
- constituents for which the lower of the site maximum or 95% UCL on the mean exceeds background (or the constituent was not detected in background soil) and no benchmark is available or no background concentration was available (indicated in green on the referenced tables);
- 3) constituents for which the maximum site concentration is less than the benchmark;
- 4) constituents for which the lower of the site maximum or 95% UCL on the mean is within background and there is no benchmark;

5) constituents detected at a frequency of less than 5%; and constituents of low toxicity.

The conclusions that can be drawn from these comparisons are:

Constituents in the first category may pose a potential risk to wildlife because soil concentrations exceed a toxicity benchmark;

Toxicity information is not available to draw conclusions about constituents in the second category;

Constituents in the third, fourth, and fifth are unlikely to present an ecological risk because the maximum concentration is less than a conservative benchmark, concentrations are consistent with background, low frequency of detection (less than 5%), or low toxicity (calcium, magnesium, and potassium).

The remainder of this section discusses the results of these comparisons for the sampling areas and soil sample types.

Undeveloped and Developed Area Surface Soils

These soil samples locations are shown on Figure 5-5. The samples are from depths of 0 to 6 inches. For these soils, the first category above represents constituents that are present in soil in at least one location at concentrations greater than a published ecological toxicity benchmark. Constituents in this category are 2,3,7,8-TCDD TEQs, total PCBs, arsenic, barium, cadmium, copper, lead, molybdenum, nickel, selenium, thallium, vanadium, and zinc. Table 7-26 identifies individual soil sample locations that exceed the benchmark. Note that many of the identified locations have concentrations slightly above the benchmark and within background. Constituents that exceed both background and the benchmark include: 2,3,7,8-TCDD TEQs (1 location out of 29 surface soil sampling locations); arsenic (1 location out of 65 surface soil sampling locations); barium (1 location out of 65 surface soil sampling locations); copper (2 locations out of 65); lead (2 locations out of 65); molybdenum (2 locations out of 65); nickel (1 location out of 65); selenium (16 locations out of 65); thallium (4 locations out of 65); vanadium (1 location out of 65); and zinc (3 locations out of 65). Detection limits for selenium in the remaining 49 samples were above the benchmark of 0.21 mg/kg.

Selenium was not detected in background soil. The Illinois Environmental Protection Agency (IEPA, 1994) reports a background range of less than 0.12 mg/kg to 2.6 mg/kg selenium in soils within metropolitan statistical areas. The average reported background concentration in

these areas is 0.58 mg/kg. Therefore, the selenium concentrations detected in site surface soil are likely to be within the range of Illinois background, although selenium was not detected in the three site-specific background samples.

Few soil concentrations from the Undeveloped and Developed Areas exceed both soil benchmarks and background. These sample locations are scattered throughout the Dead Creek floodplain and do not represent a spatial or geographical pattern. The uncertainty in this screening is due to the lack of soil benchmarks for many compounds and, in the case of selenium, detection limits greater than benchmarks.

The second category represents constituents that are present in floodplain surface soils at concentrations above background, but for which little toxicity information is available. Many constituents fall into this second category (including herbicides, pesticides, SVOCs (mainly PAHs), and VOCs), because soil benchmarks are available for only a few of the compounds detected in soil.

#### Site G Surface Soils

Four surface soil samples (from depths of 0 to 6 inches) were collected from Site G (Figure 5-5; Table 7-27a). In these samples, copper was the only constituent that exceeded both the benchmark and background concentrations. This occurred in one out of four samples (Table 7-28). 2,3,7,8-TCDD TEQs. vanadium, and zinc exceeded benchmark concentrations but were within background. Twelve pesticides were at concentrations above background, but did not have screening level benchmarks. Concentrations of the remaining constituents were either lower than the benchmarks, lower than the background concentrations, or both.

#### Site G Subsurface Soils

The subsurface soil data from Site G (Figure 5-5) came from 22 historical soil samples. Some of these samples came from greater depths (up to depths of 30 feet) than one expects to find ecological receptors. As shown on Table 7-29a, of the 63 compounds detected in these samples, 16 compounds had maximum or UCL concentrations that exceeded a screening benchmark and background. In addition, one metal, arsenic, exceeded the screening benchmark but was at a concentration within background. Thirty-three compounds didn't have screening benchmarks, but concentrations detected in Site G subsurface soil exceeded background concentrations (or no background information was available). The exceedances noted here do not necessarily represent a risk to wildlife. Some of the samples came from deeper samples at which ecological exposures will not occur.

#### Site H Surface Soils

Four surface soils were collected from Site H (Figure 5-5). As shown on Tables 7-27b and 7-28, constituents that had concentrations above the screening benchmark and above

background included 2,3,7,8-TCDD TEQs (in 3 out of 4 samples), arsenic (in 1 out of 4 samples), cadmium (in 2 out of 4 samples), copper (in 3 out of 4 samples), lead (in 2 out of 4 samples), molybdenum (in 3 out of 4 samples), nickel (in 1 out of 4 samples), selenium (in 3 out of 3 samples in which it was detected), silver (in 1 out of 4 samples), thallium (in the one sample in which it was detected), zinc (in 1 out of 4 samples), and PCBs (in 1 out of 4 samples). Vanadium exceeded its benchmark level, but was within background. One herbicide (2,4-DB), three metals (aluminum, cobalt, and mercury), nine pesticides, three PAHs, and two VOCs were detected at concentrations above background but did not have screening level benchmarks. Concentrations of the remaining constituents were either lower than the benchmarks, lower than the background concentrations, or both.

#### Site H Subsurface Soils

The subsurface soil data from Site H came from 11 historical soil samples. The depths of these soil samples are unknown. As shown on Table 7-29b, of the 68 compounds detected in these samples, 17 compounds had maximum or UCL concentrations that exceeded a screening benchmark and background. Forty-six compounds didn't have screening benchmarks, but concentrations detected in Site H subsurface soil exceeded background concentrations (or no background information was available). The exceedances noted here do not necessarily represent a risk to wildlife. These data were included to provide information on potential risks at Site H due to soils at depth greater than 6 inches, but may not represent wildlife exposures.

### Site I Surface Soils

As shown on Tables 7-27c and 7-28, constituents detected in the four surface soil samples collected from Site I (Figure 5-5) at concentrations above background and above screening levels included: 2,3,7,8-TCDD TEQs (in 2 out of 4 samples), antimony (in 3 out of 4 samples), barium (in 1 out of 4 samples), cadmium (in 2 out of 4 samples), cobalt (in 1 out of 4 samples), copper (in 4 out of 4 samples), lead (in 4 out of 4 samples), molybdenum (in 4 out of 4 samples), nickel (in 1 out of 4 samples), selenium (in the 3 samples in which it was detected), silver (in 4 out of 4 samples), zinc (in 3 out of 4 samples) and PCBs (in 2 out of 4 samples). Arsenic and vanadium concentrations exceed screening benchmarks, but are less than background. One herbicide (2,4-DB), two metals (chromium and mercury), 16 pesticides, and19 SVOCs including PAHs were at concentrations above background, but did not have screening levels. Concentrations of the remaining constituents were either lower than the benchmarks, lower than the background concentrations, or both. Site I is covered with crushed stone and is used for parking trucks and heavy equipment. Its value as habitat for wildlife is extremely limited. Therefore, these exceedances of screening benchmarks in both surface and subsurface soil are unlikely to have an ecological significance.

#### Site I Subsurface Soils

The subsurface soil data from Site I came from 16 historical soil samples. The depths of these soil samples are unknown. As shown on Table 7-29c, of the 65 compounds detected in these samples, 18 compounds had maximum or UCL concentrations that exceeded a screening benchmark and background. In addition to these, one metal, arsenic was at a concentration that exceeded the benchmark, but was within background. Thirty-eight compounds did not have screening benchmarks, but concentrations detected in Site I subsurface soil exceeded background concentrations (or no background information was available). As stated above, the habitat for wildlife is extremely limited at Site I, and these exceedances are unlikely to have an ecological significance.

#### Site L Surface Soils

In Site L (Figure 5-5) surface soils, 2,3,7,8-TCDD TEQs (in 2 out of 4 samples), antimony (in 1 out of 4 samples), arsenic (in 4 out of 4 samples), cadmium (in 1 out of 4 samples), copper (in 1 out of 4 samples), lead (in 3 out of 4 samples), molybdenum (in 4 out of 4 samples), nickel (in 3 out of 4 samples), selenium (in 4 out of 4 samples), thallium (in 4 out of 4 samples), and zinc (in 1 out of 4 samples) were above screening levels and background as shown on Tables 7-27d and 7-28. Concentrations of vanadium and PCBs exceeded screening levels but were within background. Two metals (chromium and mercury), cyanide, nine pesticides, and 17 PAHs were at concentrations above background but did not have screening level benchmarks. Concentrations of the remaining constituents were either lower than the benchmarks, lower than the background concentrations, or both. Site L is covered with cinders and used for storing heavy equipment. Its value as habitat for wildlife is extremely limited. Therefore, these exceedances of screening benchmarks in surface and subsurface soil are unlikely to have an ecological significance.

#### Site L Subsurface Soils

The subsurface soil data from Site L came from 18 historical soil samples. The depths of these soil samples are unknown. As shown on Table 7-29d, of the 66 compounds detected in these samples, 14 compounds had maximum or UCL concentrations that exceeded a screening benchmark and background. Thirty-seven compounds didn't have screening benchmarks, but concentrations detected in Site L subsurface soil exceeded background concentrations (or no background information was available). As stated above, Site L provides very little habitat for ecological receptors. Therefore, exceedance of these screening values is likely to have little ecological significance.

#### Site N Surface Soils

At Site N (Figure 5-5), concentrations of 2,3,7,8-TCDD TEQs (in 1 out of 4 samples), barium (in 2 out of 4 samples), lead (in 1 out of 4 samples), and selenium (in the one sample in which

it was detected) exceeded screening benchmarks and background concentrations in surface soils as shown on Tables 7-27e and 7-28. Copper, vanadium, and zinc concentrations exceeded screening levels, but were less than background. Six pesticides and ten PAHs were at concentrations above background but did not have screening level benchmarks. . Concentrations of the remaining constituents were either lower than the benchmarks, lower than the background concentrations, or both. There are no subsurface soil data available for Site N.

#### 8.0 DISCUSSION OF ECOLOGICAL RISK

The assessment endpoints used in this evaluation are:

Sustainability (survival, growth, and reproduction) of warm water fish species typical of those found in similar habitats (incorporates the assessment of benthic macroinvertebrates);

Survival, growth, and reproduction of local populations of aquatic wildlife represented by mallard duck, great blue heron, tree swallow, muskrat, and river otter (incorporates the assessment of benthic macroinvertebrates including shrimp and clams);

Survival, growth, and reproduction of individuals within the local bald eagle population that may overwinter near the site; and

Survival, growth, and reproduction of local populations of terrestrial wildlife along the banks and floodplain of Dead Creek.

This section evaluates the results of each measure of exposure or effect and draws conclusions with regard to each assessment endpoint. Table 8-1 demonstrates this evaluation.

# 8.1 Sustainability (survival, growth, and reproduction) of warm water fish species typical of those found in similar habitats (incorporates the assessment of benthic macroinvertebrates)

Several COPCs including herbicides, metals, PCBs, pesticides, phthalates, PAHs, and dioxins were detected in fish from the Borrow Pit Lake indicating that fish at the site are exposed to these site-related compounds. Of the COPCs detected in fish tissue, only mercury was detected at concentrations exceeding a toxicity benchmark. Mercury concentrations exceeded a toxicity benchmark in one out of three brown bullhead samples and one out of three small forage fish (minnow) samples, but not in largemouth bass. This indicates that there is some potential for adverse effects on fish due to mercury at the site. Mercury was also detected in site sediment. These measures of exposure are given medium weight on Table 8-1 because they measure actual field conditions. They are assigned a low evidence of harm because, in general, they indicate exposure, not effect. Although mercury in fish tissue exceeds a toxicity benchmark, the benchmark is a literature value (given low to medium weight) and the evidence of harm is low. The only evidence in this case was the exceedance of benchmarks.

The COPCs in surface water that exceeded available criteria or guidelines were aluminum, barium, iron, and manganese. Surface water samples were unfiltered, and the detection of

these common soil constituents in surface water may be due to sediment particles in the samples. This condition is likely to be present in other similar water bodies in the region. Therefore, concentrations of COPCs in surface water are unlikely to pose a risk to fish in the Borrow Pit Lake. These measurements were given a medium weight because although they measure actual field conditions, the exceedance of a benchmarks does not necessarily result in an effect.

Results of the evaluation of the benthic community indicated that benthic invertebrate community reflects the available habitat in Dead Creek and the Borrow Pit Lake. This measurement was given medium weight as measurement of actual field conditions. It was not given a high weight because it represents a measurement of a variable community taken at one point in time. Although concentrations of some COPCs were elevated above sediment guidelines for the protection of benthic invertebrates, it is not possible to differentiate the possible effects of COPCs in sediment from the effects of low water conditions. Even when water levels are higher, Dead Creek and the Borrow Pit Lake have silty, muddy sediments and stagnant water. The exceedance of sediment benchmarks was given low weight and a low evidence of harm. Results of toxicity testing were conflicting, but indicated toxicity in site sediment. This measure was given medium weight as an actual field measure. Overall, the prey base for fish in the Borrow Pit Lake (and Dead Creek Section F) reflects regional habitat conditions.

Some species of fish in the Borrow Pit Lake may be at risk due to body burdens of mercury elevated over a toxicity benchmark. Table 8-1 reflects low evidence of harm to fish from surface water and sediment. It should be noted that fish in many regions of the United States and Canada, in general, and Mississippi River basin in Illinois, in particular, have mercury concentrations in the same range and are not near known sources of mercury contamination. In general, fish at the site are affected by habitat conditions that are no different from conditions in other water bodies in the region including fluctuating water levels and a reduced prey base due to silty, muddy substrate. Potential risks due to site-related chemicals to fish within the Borrow Pit Lake appear to be negligible to small and are unlikely to influence the sustainability of these populations.

8.2 Survival, growth, and reproduction of local populations of aquatic wildlife represented by mallard duck, great blue heron, tree swallow, muskrat, and river otter (incorporates the assessment of benthic macroinvertebrates including shrimp and clams)

Wildlife species presence and use of the habitat appears to be high. This was given low weight because it is based on qualitative observations.

Some COPCs (metals, PAHs, herbicides, and pesticides) were detected in plants in Dead Creek Section F. This indicates that plants and wildlife that eat plants (mallards and muskrats) may be exposed to these COPCs. Food chain modeling indicated that these exposures do not result in an estimate of risk to mallards or muskrats (that is distinguishable from background risks) except when the most conservative assumptions are used with the data from the combined shallow and deeper "industry specific" sediment samples. The risks due to maximum concentrations of zinc from deeper sediment samples assuming that a mallard forages only at Dead Creek Section F year round is conservative and not representative of current conditions. Concentrations in the surface sediment were lower and did not present a risk to these species. The measure of exposure was given medium weight because it reflects actual site conditions. The measure of effect, the results of the food chain modeling, was given low weight because it is based on literature values of species behaviors and literature values for toxicity.

Since the only type of biota collected from Dead Creek Section F was plants, concentrations in other biota likely to be found there (i.e., snails and fish) were modeled using site-specific BAFs. These modeled concentrations were then evaluated using food chain models. Results indicated that COPCs that might be present in Dead Creek Section F fish do not present a risk to great blue heron or river otter. Modeled concentrations of COPCs in snails do not present a risk to mallards. Modeled concentrations of aluminum, antimony, copper, and 2,3,7,8-TCDD TEQs in snails could pose a risk to muskrats. The modeled doses of aluminum and copper exceeded the LOAEL dose, while aluminum and 2,3,7,8-TCDD exceeded the NOAEL, but not the LOAEL. This measure of effect, the results of the food chain modeling, was given low weight because it is based on literature values of species behaviors, modeled concentrations in site biota, and literature values for toxicity.

The modeling results for a tree swallow the feeds on aquatic insects in Dead Creek Section F and the Borrow Pit Lake indicate risks due to aluminum, chromium, mercury, zinc, Total PCBs, Total DDT, and dioxin when insect concentrations are modeled from sediment concentrations. This measure of effect, the results of the food chain modeling, was given low weight because it is based on literature values of species behaviors, modeled concentrations in site biota, and literature values for toxicity.

Concentrations of COPCs in surface water do not pose a risk to wildlife. As a comparison to literature values it was given a low to medium weight.

Some COPCs including herbicides, metals, PCBs, pesticides, phthalates, PAHs, and dioxin are present in fish from the Borrow Pit Lake. This measure of exposure was given a medium weight as a measure of actual site conditions. Food chain modeling indicated that these exposures do not result in risks to river otter that eat fish except under the most conservative conditions. It did indicate potential risks above a NOAEL dose (but below a LOAEL dose) to great blue heron that eat fish from the Borrow Pit Lake. This potential risk is due to mercury levels in some fish species, if herons forage mainly in the Borrow Pit Lake. If herons forage

over a wider area (which is likely since the nesting areas are at least one mile away), no risk due to mercury is estimated (or the risk due to mercury is at a background level). This measure of effect, the results of the food chain modeling, was given low weight because it is based on literature values of species behaviors and literature values for toxicity. It was given a low evidence of harm, because the modeling (not actual observations) constitutes the only evidence of harm.

Some COPCs were detected in shrimp and clams from the Borrow Pit Lake. This indicates a potential for exposure of these organisms and wildlife that eat them. This measure of exposure was given a medium weight as a measure of actual site conditions. Food chain modeling indicated that these increased exposures do not result in risks above background to mallards, muskrats, or river otter. This measure of effect, the results of the food chain modeling, was given low weight because it is based on literature values of species behaviors and literature values for toxicity.

Wildlife appear to make ample use Dead Creek and the Borrow Pit Lake. The only potential risk due to COPCs measured at the site (above concentrations attributable to background) is to piscivorous birds due to mercury in fish. This potential for risk is considered to be low because the mercury dose in fish exceeds a no effects level, but not a level associated with effects on birds. In addition, the mercury concentration in fish is similar to levels measured in fish in many regions of the U.S. and Canada and throughout the Mississippi River basin in Illinois. The use of modeled concentrations in invertebrates in Dead Creek Section F resulted in predicted risks to muskrats.

# 8.3 Survival, growth, and reproduction of individuals within the local bald eagle population that may overwinter near the site

Food chain modeling did not predict risks to bald eagles that may eat fish from the Borrow Pit Lake. The measure of exposure (COPCs detected in Borrow Pit Lake fish) is given a medium weight as actual field measurements. The modeling results are given low weight because of the literature values for eagle behavior and toxicity used in the modeling.

# 8.4 Survival, growth, and reproduction of local populations of terrestrial wildlife along the banks and floodplain of Dead Creek

The measure of effect used to evaluate this assessment endpoint was a screening of floodplain soil concentrations against ecological benchmarks and background surface soil concentrations. This measure was given low weight and low evidence of harm because it consists of a conservative screening against benchmark values which in turn are based on literature information on toxicity.

For the larger floodplain represented by Undeveloped Area and Developed Area soils, this screening indicated that some COPCs exceeded ecological benchmarks and background. However, only a few locations had COPC concentrations that exceeded both the ecological benchmark and background. The locations where concentrations exceed both screening values and background concentrations were scattered over the floodplain and did not exhibit a spatial pattern. Therefore, although a conservative screening analysis indicated that there may be some risks to terrestrial wildlife in the floodplain of Dead Creek, the scattered nature of the exceedances indicates infrequent exposure of wildlife to these scattered areas. Therefore, the screening analysis of floodplain soils does not indicate wide spread ecological risks in this area.

There were also exceedances of screening benchmarks at Sites G, H, I, L, and N. The exceedances in the surface soils at Sites G, H, and N indicate there may be some potential risk to wildlife in these areas. There were exceedances in surface soils at Sites I and L. However, since these Sites are crushed stone or cinder covered and used for parking trucks and heavy equipment, they provide little ecological habitat. Therefore, exceedances at Sites I and L are unlikely to result in ecological risk. Exceedance of screening benchmarks in subsurface soils at Sites G, H, I, and L provide some measure of potential risk if these soils become uncovered. However, because the some of the samples came from depths greater than one expects to find ecological receptors, the exceedances of benchmarks in subsurface soil do not necessarily indicate ecological risk.

# 9.0 DISCUSSION AND MANAGEMENT OF UNCERTAINTIES AND EXPOSURE ASSUMPTIONS

To insure that uncertainties in the assessment have been identified and appropriately addressed and managed to insure the results lead to decisions that are environmentally protective, this section presents potential sources of uncertainty. This section of the report identifies the major sources of uncertainty along with actions that have been taken to manage this uncertainty within the assessment.

# 9.1 Exposure Assessment Uncertainty

A variety of measurement endpoints are selected to reduce the uncertainty inherent in the evaluation of exposure in complex ecological systems. While it is impossible to evaluate the condition of every species and local population using the site, it is important to select species that may use the site, are representative of larger feeding guilds, and have a high potential for exposure.

# 9.1.1 Uncertainty Due to the Selection of Sampling Locations

The number and location of surface water, sediment, biota and soil sampling locations appear to be sufficient to characterize concentrations in these media in Dead Creek and its floodplain.

Surface water samples were not filtered prior to analysis for metals. The use of total metals concentrations for comparison to National Recommended Water Quality Criteria overstates actual exposure and results in an overestimate of risk. Although the NRWQC as used in this assessment were adjusted for total metals, it is still likely that the concentrations detected in surface water were due to entrained sediment particles, rather than metals dissolved in surface water.

Sediment samples represented both current exposures (depth of 0 to 2 inches) and potential future exposure events due to sediment scours ("industry specific" samples generally from depths of 0 to 12 inches). The use of a 0 to 2" (or even smaller layer for freshwater biota) is a standard approach for assessing current risks and was arrived at based on discussions with Dr. Chris Ingersoll of USGS. After the work was completed, the Agency requested an evaluation of potential exposure to deeper sediment. The industry specific samples were not analyzed for the same number of constituents as were the ecological sediment triad samples. Therefore, there is some uncertainty as to concentrations of some constituents in deeper sediment. This may have lead to an underestimate of potential future risk because, generally, constituent concentrations were higher in deeper sediments. However, use of the combined shallow and

deeper samples in this ecological risk assessment results in an overestimate of current risk, because concentrations in the surficial, accessible sediment are lower.

The numbers of surface soil samples in the Undeveloped and Developed Areas of the Dead Creek flood plain provide sufficient coverage of these areas. Soil samples collected from these areas came from depths of 0 to 6 inches and 3 to 6 feet. The surface samples were used in ecological risk assessment because ecological exposures are not expected to occur at depths of 3 to 6 feet. However, since some receptors, such as earthworms and burrowing mammals, may be exposed to soils deeper than 6 inches, the lack of data from these depths results in uncertainty in the assessment.

Surface soil samples at Sites G, H, I, L, and N were also collected from depths of 0 to 6 inches. Two of these sites, I and L, are covered with cinders and/or crushed stone and used for parking trucks and storing heavy equipment. Any estimate of ecological risk in these areas is an overestimate in that ecological receptors would not be expected to occur there with any frequency due to the lack of habitat.

Historical subsurface soil data were evaluated for Sites G, H, I, and L. These data were not validated, detection limits were not available, and data represent a variety of depths. Statistics for these data used only the detected values. The use of these data results in an overestimate of ecological risk. The use of detected data only results in a high bias of average or upper confidence limit concentrations. In addition, the use of samples from depths greater than approximately 2 feet results in concentrations not representative of ecological exposures.

# 9.1.2 Uncertainty Due to Selection of Reference Areas

The selection of reference areas creates uncertainty in any ecological assessment because no two waterbodies or areas are similar in all aspects. For this reason, great care was taken in the selection of reference areas. Significant effort was made to select appropriate reference areas and to obtain agreement with regulatory agencies on the areas selected. The selection process is also fraught with difficulty in that suitable areas may be on private land and unavailable for sampling. The selected areas provide suitable reference for most of Dead Creek and Borrow Pit Lake. Dead Creek Section F had fewer similarities to the reference areas than the rest of Dead Creek or the Borrow Pit Lake. At the direction of the regulatory agencies, the comparison to reference areas was removed from the ecological risk assessment because they disagreed with the selected reference areas.

The lack of a suitable reference areas introduces great uncertainty in the risk assessment. It leads to evaluating ecological risks at a site out of context and without any reference to the environmental setting that may result in non-site related ecological risks. In the area of Dead Creek, non-site related risks are likely present due to use of agricultural chemicals (herbicides and pesticides) in the surrounding watershed and aerial deposition of contaminants from off-

site sources (power plants and automotive traffic). In addition, Dead Creek receives runoff from roadway and residential areas in the surrounding watershed. Without comparison to a suitable reference water body, effects that may be present in Dead Creek and Borrow Pit Lake absent the presence of COPCs (toxicity due to non-site related chemicals, low benthic invertebrate abundance and diversity due to low water levels, low dissolved oxygen, and silty substrate) can not be evaluated on a regional basis. Therefore, the lack of a comparison to a comparable reference area is likely to result in an overestimation of risk in Dead Creek.

# 9.1.3 Uncertainty due to time of sampling

The present assessment represents conditions at one point in time and may not reflect conditions throughout the year or in the future. This demonstrates variability in the data more than uncertainty. The low water levels at the time of sampling may have confounded some of the elements of the risk assessment. The number and species of benthic invertebrates present may have been depressed by these conditions, although these conditions were similar throughout the region. It is also likely that low water conditions occur seasonally. In the absence of additional remediation, sedimentation could continue to bury and isolate COPCs identified in sediment, thereby reducing exposure to surface-dwelling benthic invertebrates and the organisms that prey upon them. Alternatively, storm events and erosion could uncover contaminated sediments, making them more available to aquatic organisms.

#### 9.1.4 Uncertainty in Selection of COPCs

This risk assessment selects COPCs based on a comparison of concentrations in surface water and sediment to toxicity benchmarks and guidelines. Surface water and sediment benchmarks are not available for all of the compounds detected. If a compound did not have a benchmark, it was carried through the risk assessment. In some cases, the potential risks due to this compound were evaluated in another portion of the risk assessment, if another type of toxicity value was available for it (e.g., tissue toxicity benchmark or wildlife NOAEL dose). In other cases, no toxicity values were available for the compound, and no conclusions could be drawn regarding its potential risk.

### 9.2 Uncertainty in the Effects Assessment

#### 9.2.1 Food Chain Modeling Uncertainty

There is uncertainty in the estimates of ingestion rates for wildlife. We rely on studies that present conservative estimates of quantity of food, water and soil in each species' diet (USEPA 1993; Beyer et al. 1994). For example, we assume that some species incidentally ingest sediment during feeding

The actual diets of the species analyzed in the food chain models include a larger diversity of food types than represented in the food chain models. The assessment relied on site data (plants, clam, fish, and shrimp) where possible and representative food types (both plant and animal tissue). It cannot capture each unique diet item in the diet of wildlife.

The quantity of sediment that an animal ingests while consuming plants or invertebrates is uncertain. The assumptions used in the food chain models are conservative to minimize the effect of the uncertainty. For certain COPCs, sediment is a significant component of the total dose. In certain cases, and for certain compounds, tissue concentrations represent a significant component of the total dose.

The food chain models were applied for two conditions; the first took into account the species foraging area and whether or not the species migrates from the site. The second condition assumed that the species forages only at Dead Creek Section F or the Borrow Pit Lake year round. There is uncertainty inherent in both sets of assumptions. The second set of assumptions greatly overestimates risk for species that migrate or range over a wide area.

Some of the food chain models used modeled concentration in biota. The biota concentrations were modeled based on site-specific BAFs and literature values. The use of these modeled concentrations results in uncertainty in the analysis an overestimate of risk. The site-specific BAFs were calculated as an average BAF using data both from the site (the entire length of Dead Creek and the Borrow Pit) and from the reference areas. Because concentrations of COPCs were generally higher at in Dead Creek, especially in the upstream areas, the BAFs from those areas were lower than those calculated for the reference areas. However, averaging these values into the assessment resulted in higher BAFs and higher modeled concentration in biota. The use of literature BAFs for aquatic insects lead to uncertainty because these values are not specific to the Dead Creek area.

# 9.2.2 Uncertainty in toxicological dose benchmarks

The development of toxicological benchmarks involves uncertainty because they are derived from laboratory studies and must be extrapolated to the field. In many cases, extrapolations are also made between species. This is standard practice in ecological risk assessment and yields benchmarks that are likely to be conservative. Testing is often rigorous, however the tests are generally performed on standard laboratory species and then the results are adjusted for other species based on body weight. While the species assessed are not standard laboratory species, they are species with readily available toxicological benchmarks.

There is considerable uncertainty in the development of dietary dose benchmarks for wildlife because few studies are available on effects on wildlife. For example, very little data are available for aluminum toxicity to mammals. A literature search for aluminum toxicity to the

muskrat returned zero articles. In many cases, it is necessary to extrapolate from studies conducted on laboratory species to effects in wildlife species of concern at the site. The magnitude of uncertainty associated with this extrapolation is unknown, but is often estimated to be within a factor of ten (Dourson and Stara, 1983). However, it could be higher for some contaminants. For example, the toxicity benchmark doses that were derived for aluminum and selenium for mammals are quite low and likely to over-predict risk or predict risk at background concentrations. The assumption that COPCs are 100% bioavailable from surface water, sediment, biota, and soil also is likely to lead to the overestimation of risk.

### 9.3 Uncertainty in Risk Characterization

This assessment calculates hazard indices using both NOAELs and LOAELs to capture uncertainty in the risk estimates. The assessment concludes that hazard indices that reflect a comparison to a NOAEL and are less than one do not indicate a risk of potential harm, and that hazard indices that reflect a comparison to a LOAEL and exceed one do indicate a risk of potential harm. However, there is considerable uncertainty for cases in which the NOAEL dose is exceeded, but not the LOAEL dose. In those cases, it cannot be established that there is no risk, because exposure is not below the NOAEL, and it cannot be established that there is risk, because exposure is not above the LOAEL.

The goal of this assessment is to examine the risk of harm to *populations* of aquatic organisms and aquatic and terrestrial wildlife. The assessment uses the hazard index approach to estimate this risk, but this does not provide the basis for estimating the likelihood that the population will be affected if a hazard index exceeds one. The simplifying assumption is made that if a hazard index based on a LOAEL for a measurement endpoint based on growth, reproduction, or survival exceeds one, then there is a risk to the population. However, effects on individuals may not always affect the population. This conservative assumption is used because few methods exist to predict population level effects.

#### 10.0 FINDINGS

The findings of the ecological risk assessment for Sauget Area I are presented below:

#### 10.1 Creek Section F Upstream of Borrow Pit Lake

#### Surface Water

 Surface water concentrations of aluminum, barium, and manganese exceeded National Recommended Water Quality Criteria. Surface water samples were unfiltered; and these metals are typical soil constituents.

#### **Sediments**

- Arsenic, cadmium, copper, iron, lead, manganese, mercury, nickel and zinc concentrations exceed TECs/PECs or LELs/SELs.
- PCBs, Total DDT, aldrin, alpha chlordane, dieldrin, gamma chlordane, heptachlor, heptachlor epoxide, and fluoranthene concentrations exceed TECs or LELs.

#### Benthic Invertebrates

- A benthic invertebrate survey indicated that these organisms are present and making use of the habitat, but that the silty substrate and low water conditions limit the numbers and types of organisms that are present.
- Amphipod toxicity testing indicated no acute or chronic toxicity.
- Chironomid toxicity testing indicated acute toxicity in Creek Section F and other waterbodies in the region far from sources of site-related COPCs.

#### Fish

• A few small minnows were observed in Creek Section F upstream of the Borrow Pit Lake. They were not abundant enough to collect for analysis.

#### Wildlife

 Wildlife appear to use Creek Section F to the same degree as other waterbodies in the region. • Food chain modeling using measured concentrations in sediment (0 to 2 inch depth), surface water, and plants indicated:

No risks to mallards foraging in this area year round.

No risk to muskrats foraging year round with the exception of a risk due to aluminum concentration in sediment that is indistinguishable from aluminum concentrations in regional background soil.

 Food chain modeling using measured concentrations in combined shallow and deeper sediment, surface water, and plants indicated:

A potential risk to mallards due to the maximum concentration of zinc detected in the deeper sediment.

No risk to muskrats foraging year round with the exception of a risk due to aluminum in sediment that is indistinguishable from aluminum concentrations in regional background soil.

 Food chain modeling using measured concentrations in sediment and surface water and estimated biota (fish or invertebrate) concentrations calculated using site-specific or literature BAFs indicated:

No risk to river otter eating fish;

No risk to great blue heron eating fish;

No risk to a mallard eating invertebrates;

Potential risk to a muskrat eating invertebrates due to aluminum, antimony, copper, and dioxin;

Potential risk to a tree swallow eating emergent aquatic insects due to aluminum, cadmium, chromium, mercury, zinc, PCBs, DDT, and dioxin.

#### 10.2 Borrow Pit Lake

Surface Water

Surface water concentrations of aluminum, barium, iron, and manganese exceeded
National Recommended Water Quality Criteria. Surface water samples were unfiltered
and these metals are typical soil constituents.

#### Sediments

- Arsenic, cadmium, copper, iron, lead, manganese, nickel and zinc concentrations exceed TECs/PECs and LELs SELs.
- DDE, DDT, gamma-BHC and heptachlor epoxide concentrations exceed TECs and LELs.

#### Benthic Invertebrates

- A benthic invertebrate survey indicated that these organisms are present and making use of the habitat, but that the silty substrate and low water conditions limit the numbers and types of organisms that are present.
- Amphipod toxicity testing indicated:

No acute effects on survival.

Statistically lower growth in the acute test period (10 days) in these organisms at two of the three stations in Borrow Pit Lake.

No chronic effects on survival, growth, or reproduction in the 42 day test period.

• Chironomid toxicity testing indicated:

Acute toxicity in the 10 day test period in one of three stations in the Borrow Pit Lake and other waterbodies in the region far from sources of site-related COPCs.

Chronic effects on survival, emergence, and reproduction in the two other (out of three) stations in Borrow Pit Lake in the 20 day test period and in other waterbodies in the region far from sources of site-related COPCs.

#### Fish

- Fish in the Borrow Pit Lake appear to be at risk due to seasonally low water levels and drought conditions that reduce the available habitat to a shallow puddle.
- Fish may be at risk due to body burdens of mercury; however, these measured body burdens are within the range measured in the Illinois portion of the Mississippi River Basin.

#### Wildlife

- Wildlife appear to use the Borrow Pit lake to the same degree as other water bodies in the region.
- Food chain modeling using measured concentrations in sediment (0 to 2 inch depth or combined shallow or deeper sediment), surface water, and fish indicated:

Great blue herons and similar piscivorous birds may be at risk due to consumption of mercury in fish if they forage only in the Borrow Pit Lake. This potential for risk is considered low because:

Herons forage over a three mile radius, and are therefore not restricted to foraging at the Borrow Pit Lake;

Mercury concentrations in fish do not exceed the level associated with adverse effects on birds.

No risks to river otter using average concentrations in environmental media.

A potential risk to river otter using maximum concentrations and restricting their foraging to the Borrow Pit Lake.

• Food chain modeling using measured concentrations in sediment (0 to 2 inch depth or combined shallow or deeper sediment), surface water, and invertebrates indicated:

No risks to mallards foraging year round on shrimp.

No risk to muskrats foraging year round on clams with the exception of a risk due to aluminum in sediment that is indistinguishable from aluminum concentrations in regional background soil.

 Food chain modeling using measured concentrations in sediment and surface water and estimated biota (invertebrate) concentrations calculated using site-specific or literature BAFs indicated:

Potential risk to a tree swallow eating emergent aquatic insects due to aluminum, chromium, mercury, zinc, DDT, and dioxin.

Food chain modeling indicates that bald eagles are not at risk unless they:

Feed year round at the Borrow Pit Lake (bald eagles overwinter in this portion of the Mississippi River basin but are not present there in the breeding season); and

Feed only at the Borrow Pit Lake (their foraging area along 2 to 4.5 miles of a river).

# 10.3 Dead Creek Floodplain Soils

Concentrations of some COPCs exceed ecological benchmarks and background soil concentrations at scattered locations in the floodplain.

These scattered exceedances of benchmarks do not have a spatial distribution and do not indicate widespread risk.

# 10.4 Waste Disposal Areas

Screening benchmarks were exceeded in surface soils at Sites G, H, I, L, and N.

Screening benchmarks were exceeded in subsurface soils at Sites G, H, I, and L.

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Table 2-1
Water, Sediment, and Habitat Parameters of Dead Creek Section F, Borrow Pit Lake, and Reference Areas
Sauget Area I

	Creek Section F	Borrow Pit Lake	Ref-1 (Prairie du Pont Creek)	Ref 2-1 (Long Slash Creek)	Ref 2-2
Water Quality Parameters					
Average pH	7.87	9.07	7.3	8	8.1
Average Total Suspended Solids (mg/L)	8.3	84	485	340	370
Average Total Dissolved Solids (mg/L)	347	370	420	310	320
Sediment Parameters		<b></b>			}
Average Total Organic Carbon (mg/kg dw)	80333	42667	17500	13000	20000
Grain size	<u> </u>				
Average % Gravel	1.8	0	0	0	0
Average % Sand	13.1	4.7	5.9	0.4	3.9
Average % Silt	42.5	62.0	57.8	65.9	54.5
Average % Clay	42.6	33.3	36.3	33.7	41.6
Habitat	<del> </del>				
Habitat Assessment Score <sup>1</sup>	181	167	115	92	115

<sup>&</sup>lt;sup>1</sup>Habitat Assessment Field Data Sheets (Low Gradient Streams) were completed for each creek section and reference areas (USEPA, 1997). These were presented in the field sampling report for the project (O'Brien & Gere Engineers, Inc., September 2000).

# TABLE 4-1 ASSESSMENT ENDPOINTS AND ASSOCIATED MEASURES OF EFFECT DEAD CREEK AND THE BORROW PIT LAKE SAUGET AREA I

#### Assessment Endpoint 1: Sustainability of warm water fish

Measure of effect 1a: body burdens of COPCs in selected fish species as a measure of exposure and effects (compared to benchmark values).

Measure of effect 1b: COPC concentrations in surface water as compared to applicable water quality criteria for protection of fish and wildlife.

Measure of effect 1c: sustainability of a benthic macroinvertebrate community that can serve as a prey base for fish:

Concentration of COPCs in sediment:

Field assessment of benthic macroinvertebrate community structure;

Sediment toxicity tests.

# Assessment Endpoint 2: Survival, growth, and reproduction of local populations of aquatic wildlife as represented by the, mallard duck, great blue heron, muskrat, and river otter

Measure of effect 2a: Wildlife species composition and habitat use.

Measure of effect 2b: Concentration of COPCs in aquatic/marsh plants for use in evaluating exposure via the food chains for mallard duck and muskrat.

Measure of effect 2c: Concentration of COPCs in surface waters in comparison to wildlife benchmarks.

Measure of effect 2d: Concentration of COPCs in fish for use in evaluating exposure via the food chain for great blue heron and river otter.

Measure of effect 2e: Concentration of COPCs in macroinvertebrates (shrimp and/or clams) for use in evaluating exposure via the food chain for mallard duck, river otter and muskrat\*.

### Assessment Endpoint 3: Survival, growth, and reproduction of individuals within the local bald eagle population that may overwinter near the site

Measure of effect 3a: Concentration of COPCs in fish for use in evaluating exposure via the food chain.

### Assessment Endpoint 4: Survival, growth, and reproduction of local populations of terrestrial wildlife along the banks and floodplain of Dead Creek

Measure of effect 4a: Soil screening effect levels for the protection of wildlife, plants, and soil dwelling invertebrates.

includes modeling of aquatic insect concentrations and food chain evaluation of a tree swallow, an insectivorous bird.

#### Table 5-1 List of Sample Stations, Dates, and QA/QC Samples for Fish Tissue Analysis Dead Creek, Borrow Pit and Reference Areas Sauget Area I

Sample Type	Sample ID	Date	Location	Species	Sample Type	Tissue Type	No. in Composite	Total Wt (g)	Notes*
Largemouth bass	LMBBP COMP-01	10/4/99	Borrow Pit	Largemouth Bass	Composite	Whole Body	3	1467.8	MS/MSD Sample
whole bodies	LMBBP COMP-02	11/3/99	Borrow Pit	Largemouth Bass	Composite	Whole Body	2	769.7	<u> </u>
	LMBBP COMP-03	11/1/99	Borrow Pit	Largemouth Bass	Composite	Whole Body	3	1004	Split with Weston
	LMBREF1 COMP-01	11/1/99	Ref-01	Largemouth Bass	Composite	Whole Body	3	1321,7	
	LMBREF1 COMP-02	11/1/99	Ref-01	Largemouth Bass	Composite	Whole Body	3	1027.3	
	LMBREF2 COMP-01	10/8/99	Ref-02-2	Largemouth Bass	Composite	Whole Body	3	922.3	
	LMBREF2 COMP-02	11/2/99	Ref-02-2	Largemouth Bass	Composite	Whole Body	3	1642.2	
			CS-F						None present
	FFBP COMP-01	10/4/99	Borrow Pit	Lepomis	Composite	Whole Body	14	115	
	FFBP COMP-02	10/6/99	Borrow Pit	Lepomis	Composite	Whole Body	151	96.1	
Ì	FFBP COMP-03	10/6/99	Borrow Pit	Lepomis	Composite	Whole Body	157	92	<del> </del>
ł	FFREF1 COMP-01	10/8/99	Ref-01	Lepomis	Composite	Whole Body	3	120.8	
	FFREF2 COMP-01	10/8/99	Ref-02-2	Crappie	Composite	Whole Body	38	126.9	
	FFREF2 COMP-02*	10/8/99	Ref-02-2	4 LMBass,1 minnow and 4 Lepomis	Composite	Whole Body	9	69.7	
ļ	FFREF2 COMP-03	10/8/99	Ref-02-1	Minnow	Composite	Whole Body	278	78.6	
Bullheads whole	BBBP COMP-01	11/1/99	Borrow Pit	Bullhead	Composite	Whole Body	9	513.7	Field duplicate
bodies	BBBP COMP-02	11/1/99	Borrow Pit	Bullhead	Composite	Whole Body	3	352.2	,
	BBBP COMP-03	10/7/99	Borrow Pit	Bullhead	Composite	Whole Body	4	227.4	
	BBREF1-2 COMP-01	10/8/99	Ref-01	Bullhead	Composite	Whole Body	3	148.8	
1	BBREF1-2 COMP-02	10/8/99	Ref-01	Bullhead	Composite	Whole Body	4	259.6	
	BBREF2-2 COMP-01	11/2/99	Ref-02-2	Bullhead	Individual	Whole Body	1	509.2	MS/MSD sample

<sup>\*</sup>At the request of the regulatory agencies, this sample was not included in the assessment because it was comprised of different species.

Table 5-2

Comparison of Maximum Surface Water Concentrations to Standards and Guidelines

Dead Creek Sector F and Borrow PH Lake

Sauget Area I

	Bre	Min	we <sup>1</sup>	NAWQ	Caleur	Tier II '	/atuas	Oak Hidge	ynantmileri	
lampounds	Maximum Detected	Acule WQ Blandards	Chronic WQ Blandards	CMC	ccc	Secondary Acute Value	Secondary Chronic Value	Lowest Chronic Value for All Organisms	Screening	Comments
lerbicides (ug/l)	1					1				
4,6·T	- 1	ł	1	1		l	1 :		Out	not detected in tw
	1	ł	ł	ł		ł			Out	not detected in sw
4,5-TP (Bilvex)						ł	}			
,4-D		ļ	ļļ				ļ .		Out	noi delected in sw
,4-DB	, j	)	] ]	ļ		1	]		Out	not detected in ew
Nalapon		Į				l			Out	not detected in fiw
Icamba	j	1	]			1	l		Out	not detected in tw
ichloroprop	1	ł	1			1	ł	}	Out	not detected in 6w
inoseb	1	I	1	1		ĺ	Ī	ľ	Oùi	not detected in 8w
ICPA	1	1	†	1	'	1	f	t	Out	not detected in sw
KCPP	i	Ť	t t			Í	t	l	Out	not detected in sw
entachiorophenol at pH / 4			<del>}</del>	13	10	1	ł	ł	Out	not detected in sw
			1	13	10	ł	ł	+	UM	LKM DEIOCIOCI III EW
letale/Inorganics (mg/l)		ŀ	ļ			ł	Į.	ł		
luminum	34	1	[	0.76*	0.087*	1	ļ	1	i in i	greater than criteria
ntimeny	- 1	]	ļ <b>i</b>			0.18	0.03	i	Out ]	not detected in sw
/Benic	0 0 1 6	0.36	0 19	0.34	0 16	0.066	0.0031*	1	l ou l	no exceedance
iarium	0.32	1	`			0 11	0.004	1	in	greater than Tier II
Hervillium Hervillium	"""	1				0 035	0.00066	l .	Out	riol detected in aw
	l l	0 024	0 0021	0.011	0 0046	1 -0.55	- CANADA		Out	not detected in sw
mumba		0024	1 00021	0011	0.0040	ł	ł	116		
Calcium	89					ł	ł	1 ''6	Out	low toxicity, nutrient
hromium	0.0041	3 3'/0 016"	0 39'/0 011"	3 4" / 0 016"	0 16"/ 0 01 1"	!			Out	no exceedance
oball	0.0015	1	1			1 1 8	0.023	1	Out	nu exceedance
Copper	0 012	0 037	0 023	0 029	0.018		[	Ĭ	Out	no exceedance
yanide, Total		0.022	0 0052	0 022	0.0052	l .	i	Ī	Out	not detected in sw
	8.7				1			i	ln	greater than criteria
ron	0 02	0 26	0.055	0 27	0 0087	1	j	]	in	greater then NAWO criters
ead		0.20	פפט ט	0 //	ימטטי ע		1	82	Out	low toxicity, nutrient
Angnesium	33	ł	! !					1 67		
Aanganese	1.7		1 .			23	0.12	1	ln .	greater then criteria
Anroury	- 1	0 0026	0.0013	0 0014	0.00077		0.0013	1	Out	not detected in aw
Aolybdenum	0.004	ł			1	16	0.37	i	Out	no <b>exceedance</b>
lickel	0.021	į	1 .	0.91	01	į.	l .	l	Out	no exceedance
	7.6	1			}	]	i	53	Out	low toxicity, nutrient
nuizaelum.	'*	i	ł		0.005	1		1	Out	not detected in aw
Selenium	ì	1	}	0.016		ì	0.00036	1	Out	not detected in aw
Hiver	_ l			0.016	1		17 00000	680	Out	low toxicity, nutrient
lodium	24							1 000		not detected in sw
l hallium		1				0,11	0 012	1	Out	
/anadium	0 014	1				0.58	0.05	1	Out	no exceedance
ine	0.076	1	1 :	0.23	0 23	1	ļ	J	Out	no exceedance
luntide (mg/l)	0 29	1		_	I	1		1	Out	water quality parameter
fardness as CaCO3 (mg/l)	350	1	1		1	1			Out	water quality parameter
	0.83		1			1	1		Out	water quality parameter
Ortho-Phosphate-P (mg/l)		1			65.9	i	1		Oui	water quality parameter
eH _	9.7	1			00.4	1		i	Out	water quality parameter
Ruspended Solids (mg/l)	160	1	1			1		[		
Total Dissolved Solids (mg/l)	480	1	1	ł	1	1	1	J	Out	water quality parameter
Total Phosphorus (mg/l)	1.2							1	Out	water quality parameter
PCB (ug/l)			1		0.014				1	
Decachiorobiphenyl	ŀ	1	I	ŀ		1	1	1	Out	not detected in sw
		i	1	l	i	i	1	1	Out	not detected in sw
Dichlorobiphenyl		1	1	l	1	1	1		Out	not detected in sw
Haptachlorobiphenyl	- 1	ł	1	ł	{	1	1	1	Out	not detected in sw
Hexachlorobiphenyl		1		l		1	1			not detected in sw
Monochiorobiphenyl	<b>I</b>	Į.		l		I			Out	
Nonachlorobiphenyl	l i	I		l			Į.	1	Out	not detected in aw
Octachlorobiphenyl	- 1	I		1	ļ	i	1	i	Out	not detected in sw
Pentachiorobiphenyl			1	1				1	Out	not detected in sw
Tetrachiorobiphenyl		1		l		1		1	Out	not detected in sw
	ſ	1	1	ſ	ſ	í	1	i	Out	not detected in sw
[richlorobiphenyl	l l	1			I	1	1	I	T 4.4.	1

### Table 5-2 Comparison of Maximum Surface Water Concentrations to Standards and Guidelines Dead Creek Sector F and Borrow Pit Lake Sauget Area I

	Site	Illin	ois <sup>1</sup>	NAWQ	Criteria <sup>2</sup>	Tier II	Values <sup>3</sup>	Oak Ridge	Preliminary	
Compounds	Maximum Detected	Acute WQ Standards	Chronic WQ Standards	CMC	CCC	Secondary Acute Value	Secondary Chronic Value	Lowest Chronic Value	Screening	Comments
Pesticides (ug/l)		Otendards	Ciarioares			Acute value	Chronic value	TOT AIT OTIGATIONS	<del> </del>	
4,4'-DDD			-			0.19	0.011			
4,4'-DDE			<del> </del>			0.19	0.011		Out	not detected in sw
4.4'-DDT	<del> </del> -		t		0.001	ļ	0.040		Out	not detected in sw
Aldrin			<del> </del>	1.1 3	0.001	ļ	0.013	·	Out	not detected in sw
				2.4*	0.00100	ļ			Out	not detected in sw
Alpha Chlordane	0.004		<del> </del>	2.4	0.0043°	l			Out	not detected in sw
alpha-BHC	0.001	l	l			39 <sup>h</sup>	2.2h		Out	no exceedance
beta-BHC	0.02	ļ	ļ			39 <sup>h</sup>	2.2 <sup>h</sup>		Out	no exceedance
delta-BHC	0.0022	l				39 <sup>h</sup>	2.2 <sup>h</sup>		Out	no exceedance
Dieldrin	0.001			0.24	0.056				Out	no exceedance
Endosulfan I	0.0024		ļ	0.22	0.056		0.51		Out	no exceedance
Endosulfan II				0.22 <sup>f</sup>	0.056		0.51		Out	not detected in sw
Endosulfan sulfate	0.0032	·					T		In	no criteria
Endrin	0.00095			0.086	0.036	1			Out	no exceedance
Endrin aldehyde	0.0032					]		i	In	no criteria
Endrin ketone	0.0027		<u> </u>				L		ln_	no criteria
Gamma Chlordane									Out	not detected in sw
gamma-BHC (Lindane)	0.0038		l	0.95					Out	no exceedance
Heptachlor	0.0029		ļ	0.52	0.0038	0.125	0.0069		Out	no exceedance
Heptachlor epoxide	0.00096			0.52	0.0038				Out	no exceedance
Methoxychlor	_	<b> </b>	ļ		0.03	<u> </u>	0.019		Out	not detected in sw
Toxaphene	<del></del>		ļ	0.73	0.0002	<del> </del>	ļ		Out	not detected in sw
SVOC (ug/l)	+		<del>                                     </del>			1	<del> </del>			
1,2,4-Trichlorobenzene						700	110		Out	not detected in sw
1,2-Dichlorobenzene		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				260	14		Out	not detected in sw
1,3-Dichlorobenzene						630	71		Out	not detected in sw
1,4-Dichlorobenzene			i i			180	15		Out	not detected in sw
2,2'-Oxybis(1-Chloropropane)									Out	not detected in sw
2,4,5-Trichlorophenol							L		Out	not detected in sw
2,4,6-Trichlorophenol									Out	not detected in sw
2,4-Dichlorophenol		L				J	<u> </u>	1	Out	not detected in sw
2,4-Dinitrophenol					l	1			Out	not detected in sw
2,4-Dinitrotoluene			1		L				Out	not detected in sw
2,6-Dinitrotoluene		Ļ	ļ <u>-</u>						Out	not detected in sw
2-Chloronaphthalene		1			<b>↓</b>			<u> </u>	Out	not detected in sw
2-Chlorophenol			<u> </u>		ļ	<u> </u>			Out	not detected in sw
2-Methylnaphthalene		<u> </u>			L	<u> </u>		<del></del>	Out	not detected in sw
2-Methylphenol (o-cresol)						230	13		Out	not detected in sw
2-Nitroaniline		<b>!</b>	-			<u> </u>			Out	not detected in sw
2-Nitrophenol		ļ	<b>↓</b>			<b>_</b>			Out	not detected in sw
3,3'-Dichlorobenzidine		L	<del>  </del>		<del></del>		<del> </del>		Out	not detected in sw
3-Methylphenol/4-Methylphenol	<b></b>	<b></b> _	ļ <b>.</b>		-		<del> </del>	<del></del>	Out	not detected in sw
3-Nitroaniline		ļ	<del>  </del>		<del></del>		<del> </del>	<del> </del>	Out	not detected in sw
4,6-Dinitro-2-methylphenol	<del></del>	<b> </b>	ļ		<del></del>		<del>                                     </del>	<del></del>	Out	not detected in sw
4-Bromophenylphenyl ether	<b></b>	<u> </u>	<u> </u>		<del> </del>	<del> </del>	1.5_	<del></del>	Out	not detected in sw
4-Chloro-3-methylphenol	<b></b>	ļ			<del></del>		<del> </del>	<u> </u>	Out	not detected in sw
4-Chloroaniline		ļ	ļi		<del></del>			<del> </del>		not detected in sw
4-Chlorophenylphenyl ether		<b>├-</b>	ļ		<del> </del>	<del></del>	<del> </del>	<del>                                     </del>	Out	not detected in sw
4-Nitroaniline		<del></del>	·		<del> </del>	4200	300	<del></del>	Out	not detected in sw
4-Nitrophenol		<b></b>	<del>                                     </del>		<del></del>	1200	300	<del> </del>		
Acenaphthene	+	<b> </b>	<b>├</b>		<del> </del>		<del> </del>	<del> </del>	Out	not detected in sw
Acenaphthylene		<u> </u>	- <del></del>		<del> </del>	<del> </del> _	0.72	<del></del>	Out	not detected in sw not detected in sw
Anthracene	<del></del>	ļ	<b> </b>		<del></del>	13	0.73	<del> </del>	Out	
Benzo(a)anthracene	<del></del>	<u> </u>	<del>                                     </del>		<del> </del>	0.49	0.027	<del> </del>	Out Out	not detected in sw
Benzo(a)pyrene		<del> </del>	<del> </del>		<del> </del>	0.24	0.014	<del> </del>	Out	not detected in sw
Benzo(b)fluoranthene		<del></del>	<del> </del> -		<del> </del>	<del> </del>	+	<del> </del>	Out	not detected in sw
Benzo(g,h,i)perylene		<del></del>	+		<del> </del>	<b>_</b>	<b> </b>	ļ	Out	not detected in sw

#### Table 5-2 Comparison of Maximum Surface Water Concentrations to Standards and Guidelines Dead Creek Sector F and Borrow PH Lake Bauget Area I

	Site	Biin	CMA <sup>T</sup>	NAWO Criteria	flore de	Velues <sup>3</sup>	(Jak Hidge	Preliminary	
	Maximum	Acute WG	Čivenic WQ	CMC CHIEFE		Secondary	Lowest Chronic Value	Screening	Comments
	Detected'	Standards	Standards	CMC CCC	Acute Value			screening	('(niniming
mpounds	Ceretion	COCCUM PERSON LANS	948708709		VCOIS ABIOS	CHICKLE AND	ion to the females of		
(2-Chloroethosy)methene			1	<b>.</b>		1 .		Out	not detected in sw
(2-Chloroethyl)ether			ļ ļ	}			ļ .	Qui	not detected in tw
(2-Ethythexyt)phthalate			1 1		27	3		Out	not detected in sw
lylbenzylphthalale						19	Į .	Out	not detected in 5w
rhazole					l l	ļ		Out	not delected in sw
rysene			1	1	i	1	]	Out	not detected in five
n-butylphthalala			1 1	ļ	190	36		Out	not detected in sw
n-octylphthalais			1 1			1	706	Out	not detected in sw
onzo(a,h)anthracene			!!!			1	1	Out	not detected in sw
enzofuran			ł I		66	3.7	I	Out	not detected in sw
thylphthalate			ł [		1800	210	Ī	Out	not detected in sw
nethylphthalate							Į.	Out	not detected in tw
oranthene	07			i i		Ī	1 15	Out	no exceedance
one v			1	Ī	70	3.9	1	Out	ned detected in sw
achiorobenzana				Ī		i	1	1 Out 1	not detected in sw
achiorobuladiene			j İ		t	i	1	Out	nut detected in tw
achiorocyclopeniadiene	'	1	1		1	1	1	Oui	not detected in Sw
achioroethana		i	1	İ	210	12	1	Out	not detected in sw
eno(1,2,3-cd)pyrene		i	1 1		1	1 .	1	Out	not detected in tw
phorone	i e	l	1 1	ł	1	1	1	Out	not detected in sw
		ł	) j	ł	J	1		Out	not detected in sw
Vitroso-di-n-propylamine		1	1	f	3800	210	(	Out	not detected in sw
Hirosodiphenylamine		}	1	ļ	190	12	<u>†</u>	Out	nut detected in sw
shthalene		ŀ	}	ł	190	1 12	<b>!</b>	Out	not detected in sw
oben <b>zene</b>		ļ	1	- 1	i	1	į.		
tachlorophenol			1		Į.	+	ł	Out	not detected in aw
nanthrene	07	Į.	ļ ļ	ļ	ļ		200	Out	no exceedance
Pnol		Į.	ļ į	1	k	į.		Out	not detected in sw
rene				+				Out	not detected in sw
OC (ug/l)		ļ	1		1		1		
1,1-1richloroethane			1 1		200	11	}	Out	not detected in sw
.2.2-1etrachloroethane	j		1 1		2100	610		Out	not detected in aw
.2-Trichloroethane	l		1 1	1	5200	1200	ļ	Out	not detected in sw
-Dichloroethane		1	1 1		630	47		Out	not detected in sw
Cichloroethene		Ì	1 1	ŀ	450	25	j	Out	not detected in sw
-(Archigroethane	l		1		8800	910	1	Out	not detected in aw
-(Xichloropropene	i	Į.	1	1	Ī	Ī	Î	Out	not detected in aw
		i .	1 1	i	240000	14000	1	Out	not detected in sw
Julanone (MEK)	ì	1	1 1		1800	99		Out	not detected in aw
lexanone	ł	ł	}		2200	170	t	Out	not detected in aw
lethyl-2-pentanone (MIBK)	۱	1	1		28000	1800	t	Out	no exceedance
rione	16	l	1		2300	130	1	Out	less than criteria
izene	1.7	1			2300	130	1	Out	not detected in sw
modichloromethane	I	]	1			1	ĺ		
motorm	l	1	1			1	1	Oul	not detected in sw
momethane (Methyl bromide)	l	1	, I		1	1	1	Out	not detected in sw
bon disulfide	ì	ľ	1	ł	17	0.92	1	Oul	not detected in aw
thon letrachloride	1		1	1	180	9.8	ļ	Out	not detected in sw
probenzene	i	1			1100	64	1	Out	not detected in sw
orgelhane	1	1	1			1	1	Oul	not delected in sw
oroform		i	l		490	28	.1	ָ טָטָן	not detected in sw
oromethane		ì	1			1	.1 .	Out	not detected in sw
		1	1			1	1	Out	not detected in sw
1,3-Dichloropropene		ł	1 1				1	Out	not detected in sw
/Trans-1,2-Dichloroethene	l .						1	Out	not detected in sw
romochloromethane	1	l			130	7.3	· · · · - · · · · · · · · · · · ·	Out	not detected in sw
ylbenzene	1	ı	1				·	Out	not detected in sw
thylene chloride (Dichloromethane)	I	1	] [		26000	2200	-		not detected in sw
rene	ŀ	1	} !					Out	
Irachloroethene	ı	1	1 1		830	90		Out	not detected in sw
uene	1	1	1		120	9.8	<del>-</del>	Out	not detected in sw
ans-1,3-Dichloropropene	1	t	ι ι	Į.	1	t	l	Out	not detected in sw

#### Comparison of Maximum Surface Water Concentrations to Standards and Guidelines Dead Creek Sector F and Borrow Pit Lake Sauget Area I

	Site	Illin	ois'	NAWQ	Criteria <sup>2</sup>	Tier II	Values <sup>3</sup>	Oak Ridge	Preliminary	
Compounds	Maximum Detected <sup>1</sup>	Acute WQ Standards	Chronic WQ Standards	СМС	ccc	Secondary Acute Value	Secondary Chronic Value	Lowest Chronic Value	Screening	Comments
richloroethene						440	47		Out	not detected in sw
/inyl chloride									Out	not detected in sw
Xylenes, Total						230 <sup>j</sup> / 32 <sup>k</sup>	13 <sup>l</sup> / 1.8 <sup>k</sup>		Out	not detected in sw
Dioxins (ug/l)										
1,2,3,4,6,7,8,9-OCDD	0.00143								In	COPC in sediment
1,2,3,4,6,7,8,9-OCDF	0.00026					i			In	COPC in sediment
1,2,3,4,6,7,8-HpCDD	0.0000692								ln .	COPC in sediment
1,2,3,4,6,7,8-HpCDF	0.0000505						İ		In	COPC in sediment
1,2,3,4,7,8,9-HpCDF	0.000548								In	COPC in sediment
1,2,3,4,7,8-HxCDD									in	COPC in sediment
1,2,3,4,7,8-HxCDF	0.000024					-			In	COPC in sediment
1,2,3,6,7,8-HxCDD									In	COPC in sediment
1,2,3,6,7,8-HxCDF	0.0000089								In I	COPC in sediment
1,2,3,7,8,9-HxCDD								_	In	COPC in sediment
1,2,3,7,8,9-HxCDF								<u> </u>	In	COPC in sediment
1,2,3,7,8-PeCDD				· -			1		ln l	COPC in sediment
1,2,3,7,8-PeCDF									ln l	COPC in sediment
2,3,4,6,7,8-HxCDF									ln	COPC in sediment
2,3,4,7,8-PeCDF	1								In	COPC in sediment
2,3,7,8-TCDD									ln l	COPC in sediment
2.3.7.8-TCDF									ln .	COPC in sediment
Total HpCDD	0.000128								In	COPC in sediment
Total HpCDF	0.0006								In	COPC in sediment
Total HxCDD	0.0000902								In	COPC in sediment
Total HxCDF	0.000581				,				In	COPC in sediment
Total PeCDD						_	1		In	COPC in sediment
Total PeCDF									In	COPC in sediment
Total TCDD					1	. 1			In	COPC in sediment
Total TCDF					1				In	COPC in sediment
Total TEQ (mammal)	1.901E-05	<b>—</b> —	1				3.1E-09		ln	greater than Great Lakes Tier

\*Criterion is for total recoverable Aluminum at pH 6.5 - 9.0; USEPA says Water-Effects ratios may be more appropriate.

<sup>b</sup>Criterion is for Arsenic V

<sup>c</sup>Criterion is for Chromium III

<sup>d</sup>Criterion is for Chromium VI

\*Criterion is for Chlordane

'Criterion is for alpha- and beta-Endosulfan

<sup>9</sup>Criterion is for PCBs

<sup>h</sup>Criterion is for BHC forms other than gamma-BHC

Criterion is for DDT

Criterion is for Xylene

\*Criterion is for m-Xylene

out = excluded from further consideration in surface water

in = selected as a COPC

For the purposes of COPC selection, hardness dependent criteria were calculated at a hardness of 220 mg/l as CaCO<sub>3</sub> (the lowest value detected on site and therefore, the most conservative value to use. Results in ug/l for organic constituents; mg/l for inorganic constituents

<sup>&</sup>lt;sup>1</sup> Illinois, 1999, Title 35 of the Illinois Administrative Code, Subtitle C, Chapter I, Part 302 Water Quality Standards, Subpart B.

<sup>&</sup>lt;sup>2</sup> USEPA, 1999, National Recommended Water Quality Criteria - Correction, Office of Water, EPA 82-2-Z-99-001 (April 1999)

<sup>3</sup> Suter, G.W. II, and C.L. Tsao, 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effect on Aquatic Biota: 1996 Revision. Risk Assessment, Health Sciences Research Division, Oak F Tennessee, ES/ER/TM-96/R2.

Table 5-3
Comparison of Maximum Sediment Concentrations to Sediment Quality Guidelines
Dead Creek Segment F and Borrow Pit Lake
Sauget Area I

		Sediment Quality	Florida	Ontario		
	Mandania	Guidelines'	SQAG'	Guidelines <sup>3</sup>		
	Maximum				Preliminary	1
Compounds	Detected <sup>4</sup>	TEC	TEL	LEL	Screening	Comment
Herbicides (ug/kg)						
2,4,5-T				ļ	ļ	
2,4,5-TP (Silvax)					İ	
2,4-D	23	1			IN	No criteria
2,4-DB			ļ		OUT	Not detected in sediment.
Dalapon		1			OUT	Not detected in sediment.
Dicamba				ļ	OUT	Not detected in sediment.
Dichloroprop		i		į	OUT	Not detected in sediment.
Dinoseb		ļ		j	OUT	Not detected in sediment.
MCPA	1	ļ	ļ	ļ	OUT	Not detected in sediment.
MCPP				ļ	OUT	Not detected in sediment.
Pentachlorophenol			ļ	ļ	OUT	Not detected in sediment.
Metals (mg/kg)		ļ	ļ	ļ	ļ	
Aluminum	17000	ļ	}	!	IN	No criteria.
Antimony	4.7	ļ	l	ļ _	IN	No criteria.
Arsenic	19	9.79	7.24	6	IN	Greater than criteria.
Barlum	420		ļ		IN IN	No criteria.
Beryllium	0.89			ļ	IN	No criteria.
Cadmium	47	0.99	0.676	0.6	IN	Greater than criteria.
Calcium	17000			ļ	OUT	Common nutrient.
Chromium	38	43.4	52.3	26	IN	Greater than criteria.
Cobalt	13	ŀ		50	OUT	Loss than criteria.
Copper	410/5400	31.6	18.7	16	IN	Greater than criteria.
Cyanide, Total				0.1	OUT	Not detected in sediment.
Iron	38000			20000	IN	Greater than criteria
Lead	320	35.8	30.2	31	IN	Greater than criteria.
Magnesium	6800		İ		OUT	Common nutrient.
Manganese	1400			460	IN	Greater than criteria.
Mercury	1.1	0.18	0.13	0.2	IN	Greater than criteria.
Molybdenum	3.7				IN	No criteria.
Nickel	390	22.7	15.9	16	IN	Greater than criteria.
Potassium	2900	]			OUT	Common nutrient
Selenium					OUT	Not detected in sediment.
Silver	0.79	ĺ	0.733	0.5	IN	Greater than criteria
Sodium	1				OUT	Not detected in sediment.
Thallium		l	l		OUT	Not detected in sediment.
Vanadium	51	}	}	j	IN	No criteria.
Zinc	3700/11000	121	124	120	IN	Greater than criteria.
pH	7.06				OUT	NA
Total Organic Carbon (mg/kg dry weight)	140000	1			OUT	NA

Table 5-3

Comparison of Maximum Sediment Concentrations to Sediment Quality Guidelines

Dead Creek Segment F and Borrow Pit Lake

Sauget Area I

		Sediment			[	<del></del>		
		Quality	Florida	Ontario	[	ł		
	Maximum	Guidelines <sup>1</sup>	SQAG <sup>2</sup>	Guidelines <sup>3</sup>	Preliminary	•		
Compounds	Detected <sup>4</sup>	TEC	TEL	LEL	Screening	Comment		
PCBs and Pesticides (ug/kg)								
Decachlorobiphenyl	ND/460				IN	Included in "industry specific" sediment only		
Dichlorobiphenyl						Not detected in sediment.		
-leptachlorobiphenyl	ND/260				IN	Included in "industry specific" sediment only		
Hexachlorobiphenyl	22/19				IN	Included as Total PCBs		
Monochlorobiphenyl					OUT	Not detected in sediment.		
Nonachlorobiphenyl	ND/270				IN	Included in "industry specific" sediment only		
Octachlorobiphenyl	ND/27				IN	Included in "industry specific" sediment only		
Pentachlorobiphenyl	66/3700				IN	Included as Total PCBs		
letrachlorobiphenyl	ND/1600				IN	Included in "industry specific" sediment only		
Trichlorobiphenyl	ND/17				IN	Included in "industry specific" sediment only		
Total PCBs	83/6470.5	59.8	21.6	70	IN	Greater than criteria		
\$,4'-DDD	3.8	4.88	1.22	8	IN	Greater than criteria		
1,4'-DDE	11	3.16	2.07	5	IN	Greater than criteria		
1,4'-DDT*	4.5	4.16	1.19	8	IN	Greater than criteria		
Total DDT	43	5.28	3.89	7	IN	Greater than criteria		
Aldrin	4.1			2	IN	Greater than criteria		
Alpha Chlordane**	5.3	3.24	2.26	7	IN	Greater than criteria		
alpha-BHC			<u> </u>	6	OUT	Not detected in sediment.		
beta-BHC				5	OUT	Not detected in sediment,		
delta-BHC	0.34				IN	No criteria.		
Dieldrin	9.3	1.9	0.715	2	IN	Greater than criteria.		
Endosulfan I	5.7				IN	No criteria.		
Endosulfan II	8.1				IN	No criteria.		
Endosulfan sulfate	9.5	·	1	<del>                                     </del>	IN	No criteria.		
Endosunan sunate Endrin	1.7	2.22	<del>                                     </del>	3	OUT	Less than criteria.		
Endrin aldehyde	14		1 -	† <b>-</b>	IN	No criteria.		
Endrin aldenyde Endrin ketone	10	<del> </del>	<del>                                     </del>	1	IN	No criteria.		
Gamma Chlordane**	17	3.24	2.26	7	IN IN	Greater than criteria.		
	4.8	2.37	0.32	3	IN	Greater than criteria.		
gamma-BHC (Lindane)	0.93	2.31	0.32	0.3 NEL	IN	Greater than criteria.		
Heptachlor	5.4	2.47	<del> </del>	0.3 NEL 5	IN	Greater than criteria.		
Heptachlor epoxide		2.41	<del> </del>	<del> </del> -	IN	No criteria.		
Methoxychlor	24	<del> </del>	-	<del> </del>	OUT			
Toxaphene		<u></u>		<u> </u>	001	Not detected in sediment.		

Table 5-3 Comparison of Maximum Sediment Concentrations to Sediment Quality Guidelines Dead Creek Segment F and Borrow Pit Lake Sauget Area I

		Sediment Quality	Florida	Ontario		
	Maximum	Guidelines <sup>1</sup>	SQAG'	Guidelines'	Preliminary	
Compounds	Detected <sup>4</sup>	TEC	TEL	LEL	Screening	1
BVOCs ug/kg						
1,2,4-Trichlorobenzene	İ	1			OUT	Not detected in sediment.
I.2-Dichlorobenzene	1			Í	OUT	Not detected in sediment.
I.3-Dichlorobenzene			Ì		OUT	Not detected in sediment.
1.4-Dichlorobenzene		İ	ľ	ľ	OUT	Not detected in sediment.
2,2'-Oxybis(1-Chloropropane)	1	1		ł	OUT	Not detected in sediment.
2,4,5-Trichlorophanol		ľ	1	ţ	OUT	Not detected in sediment.
2,4,6-Trichlorophenol			1	j	OUT	Not detected in sediment.
2,4-Dichlorophenol	1	ł	ľ	i	OUT	Not detected in sediment.
2,4-Dinitrophenol	1	1		Ì	OUT	Not detected in sediment.
P,4-Dinitrotoluene	1	1		ľ	OUT	Not detected in sediment.
2,6-Dinitrotoluene	ľ	1	ł	ł	OUT	Not detected in sediment.
2-Chloronaphthalene	1		ì	1	OUT	Not detected in sediment.
2-Chlorophenol	1		1	1	OUT	Not detected in sediment.
2-Methylnaphthalene	1	†	20.2	}	OUT	Not detected in sediment.
- ·		1	20.2	ł	OUT	Not detected in sediment.
2-Methylphenol (o-cresol) 2 Nitronniline				ł	OUT	Not detected in sediment.
	ŀ	1	ľ		OUT	Not detected in sediment.
2-Nitrophenol		1	1	}	OUT	Not detected in sediment.
3,3'-Dichlorobenzidine		1	1	1	OUT	Not detected in sediment.
3-Methylphenol/4-Methylphenol			ł		OUT	
3-Nitroaniline			ł			Not detected in sediment.
4,6-Dinitro-2-methylphenol			ł	}	OUT	Not detected in sediment.
4-Bromophenylphenyl ether			ł		OUT	Not detected in sediment.
4-Chloro-3-methylphenol		ł	ł	ł	OUT	Not detected in sediment.
4-Chloroaniline			1	1	OUT	Not detected in sediment.
4-Chlorophenylphenyl ether			l		OUT	Not detected in sediment.
4-Nitroaniline					OUT	Not detected in sediment.
4-Nitrophenol		1	l		OUT	Not detected in sediment.
Acenaphthene		İ	6.71		OUT	Not detected in sediment.
Acenaphthylene		ļ	5.87		OUT	Not detected in sediment.
Anthracene		57.2	46.9	220	OUT	Not detected in sediment.
Bonzo(a)anthracene		108	74.8	320	OUT	Not detected in sediment.
Benzo(a)pyrene	ļ	150	88.8	370 _	OUT	Not detected in sediment.
Benzo(b)fluoranthene	1				OUT	Not detected in sediment.
Benzo(g,h,i)perylene		1		170	OUT	Not detected in sediment.
Benzo(k)fluoranthene				240	OUT	Not detected in sediment.
bis(2-Chloroethoxy)methane					OUT	Not detected in sediment.
bls(2-Chloroethyl)ether	l l	1			OUT	Not detected in sediment.
bis(2-Ethylhexyl)phthalate	1	1	182		OUT	Not detected in sediment.
Butylbenzylphthalate	1	1	ì	ł	OUT	Not detected in sediment.

# Table 5-3 Comparison of Maximum Sediment Concentrations to Sediment Quality Guidelines Dead Creek Segment F and Borrow Pit Lake Sauget Area I

		Sediment	Γ		<u> </u>	
		Quality	Florida	Ontario		
	Maximum	Guidelines <sup>1</sup>	SQAG <sup>2</sup>	Guidelines <sup>3</sup>	  Preliminary	
Compounds	Detected <sup>4</sup>	TEC	TEL	LEL	,	Comment
Carbazole		120	1 1 1 1 1 1		OUT	Not detected in sediment.
Chrysene	74	166	108	340	OUT	
Di-n-butylphthalate	— <del> '</del>	100	100	340	OUT	Less than criteria.
Di-n-octylphthalate	<del></del>		<u> </u>		OUT	Not detected in sediment.
Dibenzo(a,h)anthracene	<del></del>	33	6.22	60	OUT	Not detected in sediment.
Dibenzofuran		<del>  33</del>	0.22	60	OUT	Not detected in sediment.  Not detected in sediment.
Diethylphthalate	<del></del>		<del> </del>	ļ	OUT	
Dimethylphthalate					OUT	Not detected in sediment.  Not detected in sediment.
Fluoranthene	130	423	113	750	IN	Greater than criteria.
Fluorene	130	77.4	21.2	190	OUT	Not detected in sediment.
Hexachlorobenzene		11.4	21.2	190	OUT	
Hexachlorobutadiene		<del> </del>			OUT	Not detected in sediment.  Not detected in sediment.
Hexachlorocyclopentadiene		<del> </del>		}	OUT	Not detected in sediment.
Hexachloroethane			-	1	OUT	Not detected in sediment.
Indeno(1,2,3-cd)pyrene			<u> </u>	200	OUT	Not detected in sediment.
		1	-	200	OUT	Not detected in sediment.
Isophorone	<del></del>	<del> </del>		<del> </del>	OUT	Not detected in sediment.
N-Nitroso-di-n-propylamine		<del>                                     </del>		<del> </del>	OUT	
N-Nitrosodiphenylamine	-	176	24.0		<del></del>	Not detected in sediment.
Naphthalene		1/0	34.6		OUT	Not detected in sediment.  Not detected in sediment.
Nitrobenzene		<b> </b>			OUT	Not detected in sediment.
Pentachlorophenol		204	-007	560	OUT	
Phenanthrene		204	86.7	200	OUT	Not detected in sediment.
Phenol		405	450	400		Not detected in sediment.
Pyrene	440	195	153	490	OUT	Not detected in sediment.
Total PAHs	440	1610	1684	4000	OUT	Less than criteria
VOCs ug/kg			ļ			<u></u>
1,1,1-Trichloroethane			<del> </del>		OUT	Not detected in sediment.
1,1,2,2-Tetrachloroethane			<del> </del>		OUT	Not detected in sediment.
1,1,2-Trichloroethane			ļ		OUT	Not detected in sediment.
1,1-Dichloroethane			ļ		OUT	Not detected in sediment.
1,1-Dichloroethene			<b> </b>		OUT	Not detected in sediment.
1,2-Dichloroethane					OUT	Not detected in sediment.
1,2-Dichloropropane		<u> </u>	ļ	<del> </del>	OUT	Not detected in sediment.
2-Butanone (MEK)		1	<del> </del>	<u> </u>	OUT	Not detected in sediment.
2-Hexanone			<b> </b>	ļ	OUT	Not detected in sediment.
4-Methyl-2-pentanone (MIBK)			ļ	ļ	OUT	Not detected in sediment.
Acetone			<u> </u>		OUT	Not detected in sediment.
Benzene		.	<u> </u>		OUT	Not detected in sediment.
Bromodichloromethane	1		<u> </u>	ļ	OUT	Not detected in sediment.
Bromoform	_		1	<u> </u>	OUT	Not detected in sediment.

Table 5-3
Comparison of Maximum Sediment Concentrations to Sediment Quality Guidelines
Dead Creek Segment F and Borrow Pit Lake
Sauget Area I

	Maximum	Sediment Quality Guidelines		Ontario Guidelines³	Preliminary	
Compounds	Detected <sup>4</sup>	TEC	TEL	LEL	Screening	Comment
Bromomethane (Methyl bromide)					OUT	Not detected in sediment.
Carbon disulfide	1	1	1		OUT	Not detected in sediment.
Carbon tetrachloride	1		Ì		OUT	Not detected in sediment.
Chlorobenzene	1	1	]		OUT	Not detected in sediment.
Chloroethane		1			OUT	Not detected in sediment.
Chloroform	1		[		OUT	Not detected in sediment.
Chloromethane					OUT	Not detected in sediment.
cis-1,3-Dichloropropene				ì	OUT	Not detected in sediment.
Cis/Trans-1,2-Dichloroethene	Į.			l	OUT	Not detected in sediment.
Dibromochloromethane	i	Į.		1	OUT	Not detected in sediment.
Ethylbenzene	11		]	[	IN	No criteria.
Methylene chloride (Dichloromethane)	1	]		]	OUT	Not detected in sediment.
Styrene	j		]	]	OUT	Not detected in sediment.
Tetrachloroethene		ľ	,	,	OUT	Not detected in sediment.
Toluene	{		j		OUT	Not detected in sediment.
trans-1,3-Dichloropropene					OUT	Not detected in sediment.
Trichloroethene			1	1	OUT	Not detected in sediment.
Vinyl chloride				[	OUT	Not detected in sediment.
Xylenes, Total				[	OUT	Not detected in sediment.
Dioxin TEQ (mammal) pg/g	333				IN	No criteria.

Notes: Except where noted, concentrations in ug/kg for organic constituens; mg/kg for inorganic constituents.

OUT = excluded from further consideration in sediment

IN = selected as COPC

NA = Not applicable

ND = Not detected

NEL = No-Effect Level

<sup>&</sup>lt;sup>1</sup> Threshold Effects Concentration -

<sup>&</sup>lt;sup>2</sup> Sediment Quality Assessment

<sup>&</sup>lt;sup>3</sup> Lowest Effects Level - Persaud, D., R.

<sup>&</sup>lt;sup>4</sup> A blank in this column indicates that compound was not detected in sediment in this location. If two values appear, the first is for ecological sediment samples (0 to 2 inch depth) and the second is for "industry specific" sediment samples (sediment cores to refusal; generally about 1 to 1.5 foot depth).

<sup>\*</sup> Ontario and Sediment Quality Guideline values are for 2,4'-DDT and 4,4'-DDT combined

<sup>\*\*</sup> Florida, Ontario, and Sediment Quality Guideline values are for Chlordane

Table 5-4 Selection of COPCs for Ecological Risk Assessment Sauget Area I

2.4.5 P	Compounds	Maximum Detected Sediment	Sediment Screened In	Maximum Detected in Surface Water	Surface Water Screened In	Maximum Detected LMB Site	Maximum Detected BB Site	Maximum Detected Clam Site	Maximum Detected Forage Fish Site	Maximum Detected Plants Site	Maximum Detected Shrimp Site	Selected as
2.4-D 23 IN 2.4-DB	HERBICIDES											
2.4-D			-									NO
2.4-D	2,4,5-TP (Silvex)											NO
Dalapon   Dicamba   1.9   2.6     Dichloroprop   6.6   32   6.7   7     Dicoseb   Dichloroprop   1800   3300     Dicomba   D		23	IN									YES
Dalapton   1.9   2.6	2,4-DB								10			YES
Dicamba   1.9   2.6	Dalapon											NO
Dichloroprop	Dicamba					1.9			2.6	•		YES
Dinoseb   MCPA	Dichloroprop						6.6	32	6.7	7		YES
MCPA	Dinoseb											NO
MCPP	MCPA					1800			3300		<u> </u>	YES
Pentachlorophenol	MCPP							4000				YES
NORGANICS	Pentachlorophenol								2.2		1.8	YES
Aluminum												
Antimony   4.7   IN   0.015   0.96   0.58		17000	IN	3.4	IN	33	18	13	52	44	28	YES
Arsenic   19												YES
Barlum				0.015				0.96			0.10	YES
Beryllium	·				IN					0.00		YES
Cadmium         47         IN         0.12           Calcium         17000         89           Chromium         38         IN         0.0041         0.93         0.7         1.1         0.32         0.097         0.23           Cobalt         13         0.0015         0.68         0.89         0.99         1.7         2.1         8.3           Cyanide, Total         Iron         38000         IN         8.7         IN           Lead         320         IN         0.02         IN         0.064         0.25         0.25         0.59         2.1         0.39           Magnesium         6800         33         3												YES
Calcium         17000         89           Chromium         38         IN         0.0041         0.93         0.7         1.1         0.32         0.097         0.23           Cobalt         13         0.0015								0.12				YES
Chromium         38         IN         0.0041         0.93         0.7         1.1         0.32         0.097         0.23           Cobalt         13         0.0015         Copper         410/5400         IN         0.012         0.68         0.89         0.99         1.7         2.1         8.3           Cyanide, Total         Iron         38000         IN         8.7         IN           Lead         320         IN         0.02         IN         0.064         0.25         0.25         0.59         2.1         0.39           Magnesium         6800         33         Magnesium         6800         33         Magnesium         6800         33         Magnesium         0.26         0.6           Molybdenum         3.7         IN         0.004         IN         0.02         0.6           Potassium         2900         7.6         5           Selenium         0.63         0.54           Silver         0.79         IN         0.02         0.09           Sodium         0.0014         0.014         0.0014				89								NO
Cobalt         13         0.0015           Copper         410/5400         IN         0.012         0.68         0.89         0.99         1.7         2.1         8.3           Cyanide, Total         Iron         38000         IN         8.7         IN           Lead         320         IN         0.02         IN         0.064         0.25         0.25         0.59         2.1         0.39           Magnesium         6800         33         33         33         33         33         34         34         34         34         35         35         35         35         35         36         35         36         <			IN			0.93	0.7	1.1	0.32	0.097	0.23	YES
Copper         410/5400         IN         0.012         0.68         0.89         0.99         1.7         2.1         8.3           Cyanide, Total         Iron         38000         IN         8.7         IN           Lead         320         IN         0.02         IN         0.064         0.25         0.25         0.59         2.1         0.39           Magnesium         6800         33         33         33         33         33         34         34         35         36         36         36         36         36         36         36         37         37         38         39         2.1         0.39         39         18         39         18         39         39         18         39         39 <td></td> <td></td> <td></td> <td></td> <td></td> <td><u> </u></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>NO</td>						<u> </u>						NO
Cyanide, Total         Iron         38000         IN         8.7         IN           Lead         320         IN         0.02         IN         0.064         0.25         0.25         0.59         2.1         0.39           Magnesium         6800         33         33         33         33         33         34         35         3			IN			0.68	0.89	0.99	1.7	21	8.3	YES
Iron         38000         IN         8.7         IN           Lead         320         IN         0.02         IN         0.064         0.25         0.25         0.59         2.1         0.39           Magnesium         6800         33         Manganese         1400         IN         1.7         IN           Mercury         1.1         IN         0.26         0.6           Molybdenum         3.7         IN         0.004           Nickel         390         IN         0.021         2.6           Potassium         2900         7.6         3         0.54           Selenium         0.79         IN         0.02         0.09           Soliver         0.79         IN         0.02         0.09           Thallium         Vanadium         51         IN         0.014		410/0400		0.012		0.00	0.00	0.00	•••			NO
Lead         320         IN         0.02         IN         0.064         0.25         0.25         0.59         2.1         0.39           Magnesium         6800         33         Manganese         1400         IN         1.7         IN           Mercury         1.1         IN         0.26         0.6           Molybdenum         3.7         IN         0.004           Nickel         390         IN         0.021         2.6           Potassium         2900         7.6         30.63         0.54           Selenium         0.63         0.54         0.09           Sodium         24         0.02         0.09           Thallium         Vanadium         51         IN         0.014		38000	IN	8.7	IN		***					YES
Magnesium         6800         33           Manganese         1400         IN         1.7         IN           Mercury         1.1         IN         0.26         0.6           Molybdenum         3.7         IN         0.004           Nickel         390         IN         0.021         2.6           Potassium         2900         7.6         30.63         0.54           Selenium         0.63         0.54         0.09           Sodium         24         0.02         0.09           Thallium         Vanadium         51         IN         0.014						0.064	0.25	0.25	0.59	2.1	0.39	YES
Manganese						0.001		0.20	<u> </u>		- 0.00	NO
Mercury   1.1   IN   0.26   0.6			IN		IN							YES
Molybdenum         3.7         IN         0.004           Nickel         390         IN         0.021         2.6           Potassium         2900         7.6         3.7							0.26		0.6			YES
Nickel   390   IN   0.021   2.6				0.004	·	_	<u> </u>		0.0			YES
Potassium   2900   7.6										26		YES
Selentum         0.63         0.54           Silver         0.79         IN         0.02         0.09           Sodium         24         1         24			114			~						NO
Silver         0.79         IN         0.02         0.09           Sodium         24           Thallium         51         IN         0.014		2900		1.0		0.63			0.54			YES
Sodium   24     Thallium		0.70	IM			0.03		0.02	0.07		0.09	YES
Thallium  Vanadium 51 IN 0.014		0.79	IIN	24	· · · · · · · · · · · · · · · · · · ·			0.02			0.00	NO
Vanadium 51 IN 0.014		·										NO NO
Transaction Transa		E4	INI	0.014								YES
Zinc 3700/11000 IN 0.075 19 22 22 33 26 16				0.075		19	22	22	33	26	16	YES

Table 5-4
Selection of COPCs for Ecological Risk Assessment
Sauget Area I

	Maximum Detected	Sediment Screened	Maximum Detected in Burface	Surface Water	Maximum Detected LMB	Maximum Detected BB	Maximum Detected Clam	Maximum Detected Forage Fish	Maximum Detected Plants	Maximum Detected Shrimp	Selected as
Compounds	Sediment	ln _	Water	Screened in	Bite	Site	Site	Site	8Ite_	Site	COPC
PCBs_	·										
Decachiorobiphenyl	ND/460	IN'									
Dichlorobiphenyl											
Heptachlorobiphenyl	ND/460	IN*			21						
Hexachlorobiphenyl	22/19	IN			150	52		22			
Monochlorobiphenyl											
Nonachlorobiphenyl	ND/270	IN*									
Octachiorobiphenyl	ND/270	IN*									
Pentachiorobiphenyl	00/3700	IN			130	52		8 7			
Tetrachlorobiphenyl	ND/1600	IN.			46						
Trichlorobiphenyl	ND/17	IN.		_				_			
Total PCBs	83/8470.5	IN			320	104		39			YE8
PESTICIDES											
4,4'-DDD	3.8	IN									YE8
4,4'-DDE	11	IN			21	29		10			YES
4.4'-DDT	4.5	IN						***************************************			YES
Total DDT	43	IN			21	29		10			YE8
Aldrin	4.1	IN									YES
Alpha Chlordane	5.3	IN				12			0.81		YES
alpha-BHC			0.001						,		NO
beta-BHC			0.02								NO
delta-BHC	0.34	IN	0.0022								YES
Dieldrin	9.3	IN	0.001								YES
Endosulfan I	5.7	IN	0.0024								YES.
Endosulfan II	8.1	IN			-						YE8
Endosulfan sulfate	9.5	IN	0.0032	IN							YE8
Endrin	1.7		0.00095		-						NO
Endrin aldehyde	14	IN	0.0032	IN							YES
Endrin ketone	10	IN	0.0027	IN							YES
Gamma Chiordane	17	IN			19	11			3.1		YES
gamma-BHC (Lindane)	4.8	IN	0.0038								YES
Heptachior	0.93	IN	0.0029		1.5	2.8	2.3		1.9		YES
Heptachior epoxide	5.4	IN	0.00096		.,-	=: ₹					YE8
Methoxychlor	24	iN					5.4				YES
Toxaphene		***									NO

#### Table 5-4 Selection of COPCs for Ecological Risk Assessment Sauget Area I

<del></del>		-	Maximum		Maximum	Maximum	Maylmum	Maximum	Mandan	Mandana	
	Maximum	Sediment	Detected	Surface	Detected	Detected	Detected	maximum Detected	Maximum Detected	Maximum Detected	
	Detected	Screened	in Surface	Water	LMB	BB	Clam	Forage Fish	Plants	Shrimp	Selected as
Compounds	Sediment	In	Water	Screened In	Site	Site	Site	Site	Site	Site	COPC
SVOC											
1.2.4-Trichlorobenzene		•						<del></del>		<del></del>	NO
1.2-Dichlorobenzene								<del></del>			NO NO
1,3-Dichlorobenzene		-									NO NO
1,4-Dichlorobenzene		-	<del></del> -					<del></del>			NO NO
2,2'-Oxybis(1-Chloropropane)		_						·			NO NO
2,4,5-Trichlorophenol								·		<del></del>	NO NO
2,4,6-Trichlorophenol		_						·	<del></del>		NO NO
2,4-Dichlorophenol							– –	·			NO NO
2,4-Dinitrophenol	··· <del>-</del>		······································								NO NO
2,4-Dinitrotoluene			·		-						NO
2,6-Dinitrotoluene										··	NO NO
2-Chloronaphthalene					<del> </del>			·			NO
2-Chlorophenol					_						NO NO
2-Methylnaphthalene		-						·			NO
2-Methylphenol (o-cresol)	<del></del>										NO
2-Nitroaniline					<del>-</del>						NO NO
2-Nitrophenol			·····								NO
3,3'-Dichlorobenzidine	· · · · · · · · · · · · · · · · · · ·						-	•			NO NO
3-Methylphenol/4-Methylphenol	·							·			NO
3-Nitroaniline											NO
4,6-Dinitro-2-methylphenol											NO
4-Bromophenylphenyl ether											NO
4-Chloro-3-methylphenol											NO
4-Chloroaniline			-							-	NO
4-Chlorophenylphenyl ether				· · · · · · · · · · · · · · · · · · ·							NO
4-Nitroaniline			<del></del>							-	NO
4-Nitrophenol	****										NO
Acenaphthene											NO
Acenaphthylene									32		YES
Anthracene			<del></del> -								NO
Benzo(a)anthracene											NO
Benzo(a)pyrene									140		YES
Benzo(b)fluoranthene							<u>-</u> -	· · · · · · · · · · · · · · · · · · ·	59		YES
Benzo(g,h,i)perylene									360		YES
									52		YES
Benzo(k)fluoranthene								·	<u> </u>		NO
bis(2-Chloroethoxy)methane											
bis(2-Chloroethyl)ether						97	170	230			YES
bis(2-Ethylhexyl)phthalate	<del></del>						170				
Butylbenzylphthalate								<del></del>	<del></del>	<del></del>	NO NO
Carbazole	74							· <del>-</del>			NO
Chrysene	74	-			32						YES
Di-n-butylphthalate					32					<del></del>	NO
Di-n-octylphthalate	<del></del>					<del></del> -		48	76		YES
Dibenzo(a,h)anthracene								40			

Table 5-4 Selection of COPCs for Ecological Risk Assessment Sauget Area I

Compounds	Maximum Detected Sediment	Sediment Screened In	Maximum Detected in Surface Water	Surface Water Screened in	Maximum Detected LMB Site	Maximum Detected BB Site	Maximum Detected Clam Site	Maximum Detected Forage Fish Site	Maximum Detected Plants Site	Maximum Detected Shrimp Site	Selected as
Dibenzofuran											NO
Diethylphthelate	······	*				18	120	37		44	YES
Dimethylphthalate											NO
Fluoranthene	130	IN	0.7								YES
Fluorene	<del></del>	*****	·								NO
Hexachlorobenzene											NO
Hexachlorobutadiene		=									NO
Hexachlorocyclopentadiene						<del></del>					NO
Hexachloroethane						<del></del>					NO
Indeno(1,2,3-cd)pyrene	<del></del>	·						54	300		YES
Isophorona			-								NO
N-Nitroso-di-n-propylamine											NO
N-Nitrosodiphenylamine											NO
Naphthalene											NO
Nitrobenzene									· · · · · · · · · · · · · · · · · · ·		NO
Pentachiorophenol											NO
Phenanthrene			0.7								NQ
Phenol											NO
Pyrene		_									NQ
Total PAHs	440		1.4					102	1019		YES
VOC											
1,1,1-Trichloroethane											NO
1,1,2,2-Tetrachloroethane											NO
1,1,2-Trichloroethane		_									NO
1,1-Dichloroethane											NO
1,1-Dichloroethene											NO
1,2-Dichloroethane											NQ
1,2-Dichloropropane											NO
2-Butanone (MEK)											NO
2-Hexanone											NO
4-Methyl-2-pentanone (MIBK)											NO
Acetone			18								NO
Benzene			1.7		=						NO
Bromodichloromethane											NO
Bromoform				· ·							NO
Bromomethane (Methyl bromide)											NO
Carbon disulfide											NO
Carbon tetrachloride											NO_
Chlorobenzene											NO
Chloroethane						-					NO NO
Chloroform						·					NO
Chloromethane											NO_
cis-1,3-Dichloropropene					. =						NO NO
Cis/Trans-1,2-Dichloroethene					-						NO_
Dibromochloromethane											NO

Table 5-4
Selection of COPCs for Ecological Risk Assessment
Sauget Area I

Compounds	Maximum Detected Sediment	Sediment Screened In	Maximum Detected in Surface Water	Surface Water Screened In	Maximum Detected LMB Site	Maximum Detected BB Site	Maximum Detected Clam Site	Maximum Detected Forage Fish Site	Maximum Detected Plants Site	Maximum Detected Shrimp Site	Selected as
Ethylbenzene	11	IN	-			•				-	NO
Methylene chloride (Dichloromethane)											NO
Styrene					·						NO
Tetrachloroethene											NO
Toluene											NO
trans-1,3-Dichloropropene											NO
Trichloroethene											NO
Vinyl chloride											NO
Xylenes, Total											NO
Dioxin TEQ (mammal)	0.333	IN	1.01E-05	IN	0.0035	0.0037	0.00015	0.0018	0.0002	0.00022	YES

LMB = Largemouth Bass

BB = Brown Bullhead

2,4-Dimethylphenol was also detected in Site plants at 51 ug/kg

Sediment and tissue concentrations in ug/kg except metals which are in mg/kg; surface water concentrations are in ug/L except metals which are mg/L.

\*Indicates detected in "industry specific" sediment samples only.

Table 7-1
Comparison of Largemouth Bass Concentrations to Toxicity Benchmarks
Sauget Area I

	1	Site		Reference	Reference
Compound	Benchmark	Maximum	Site Average	Maximum	Average
Herbicides (ug/kg)		† - <del></del>			
2.4-D	NA NA	ND	ND	ND	ND
2.4-D8	NA NA	ND	ND	ND	ND
Dicamba	NA NA	1.9	5.6	ND	ND
Dichloroprop	NA	ND	ND	ND	ND
MCPA	NA.	1800	1267	ND	ND
MCPP	NA NA	ND	GN	ND	ND
Pentachiorophenol	9600	ND	ND	ND	ND_
Metals (mg/kg)					
Aluminum, Total	NA NA	33	20	81	41
Antimony	NA NA	ND	ND	ND	ND
Arsenic, Total	0.52	ND	ND	ND	ND
Barium, Total	NA S	ND	ND	ND	ND
Cadmium, Total	0.5	ND	ND I	ND	ND 0.00
Chromium, Total	NA 13.4	0.93	0.64	0.36	0.28
Copper, Total Iron	12.1 NA	0.68 ND	0.54 ND	0.8 ND	0.5 ND
Iron Lead, Total	26.2	ND ND	ND ND	ND DN	ND
Manganese	Z6.∠ NA	ND ND	ND D	טא מא	ND ND
Mercury	0.25	0.064	0.043	0.1	0.1
Molybdenum	NA NA	ND	ND ND	ND	ND
Nickel. Total	NA NA	ND	ND	ND	ND
Selenum	1.6	0.63	0.49	0.86	0.60
Silver	NA NA	ND	ND	ND	ND
Zinc. Total	NA I	19	17	15	11
Total PCBs (ug/kg)	950	320	237	ND	ND
Pesticides (ug/kg)		-			
4.4'-000	600	ND	ND	ND	ND
4.4'-DOE	29200	21	14	6.6	5.3
4,4'-DDT	3800	ND .	ND	ND	ND
Aldrin	157	ND	ND	ND	ND
Alpha Chlordane	16600 *	ND	ND	ND	ND
delta-BHC	NA	ND	ND	ND	ND
Dieldnn	3700	ND	ND	5.6	5.0
Endosulfan i	195 <sup>5</sup>	ND	ND	ND	ND
Endosulfan II	195 <sup>B</sup>	ND	ND	ND	ND
Endosulfan sulfate	195 <sup>t</sup>	ND	ND	ND	ND
Endnn aldehyde	150 °	ND	ND	ND	ND
Endrin ketone	150 °	ND	ND	ND	ND
Gamma Chlordane	16600 *	19	12	ND	ND
gamma-BHC (Lindane)	NA.	ND	ND	ND	ND
Heptachlor	5700	1.5	2.8	ND	ND
Heptachlor epoxide	3200	ND	ND	ND	ND
Methoxychlor	128	ND	ND	ND	ND
SVOC (ug/kg)					
bis(2-ethylhexyl)phthalate	NA NA	ND	ND	ND	ND
Di-n-butylphthalate	NA	32	67	20	52
Diethylphthalate	NA NA	ND	ND	ND	ND
Acenaphthylene	NA	ND	ND	ND	ND
Fluoranthene	NA	ND	ND	ND	ND
Benzo(b)fluoranthene	NA	ND	ND	ND	ND
Benzo(k)fluoranthene	NA .	ND	ND	ND	ND
Benzo(a)pyrene	23.9	ND	ND	ND	ND
Benzo(g,h.i)perylene	NA	ND	ND	ND	ND
Indeno(1,2,3-c-d)pyrene	NA .	ND	ND	ND	ND
Dibenz(a,h)anthracene	NA NA	ND	ND	ND	ND
2.3.7.8-TCDO, TEQ. ug-kg **Ataximum and Average TEQs	0.05	0.003	0.0021	0.00019*	0.00011*

<sup>\*</sup> Maximum and Average TEQs for fish were used for companson to benchmark.

a Benchmark value is for Chlordane

b Benchmark value for Endosulfan was used

c Benchmark values for Endrin were used

Table 7-2 Comparison of Brown Bullhead Concentrations to Toxicity Benchmarks Sauget Area I

		Site	Site	Reference	Reference
Compound	Benchmark	Maximum	Average	<u>Maximum</u>	Average
Herbicides (ug/kg)					[
2,4-D	NA	ND	ND	ND	ND
2,4-DB	NA	ND	ND	ND	ND
Dicamba	NA	ND	ND	ND	ND
Dichloroprop	NA	6.6	35.5	ND	ND
MCPA	NA	ND	ND	8600	3533
MCPP	NA	ND	ND	ND	ND
Pentachlorophenol	9600	ND	ND	ND	ND
Metals (mg/kg)		4.0			
Aluminum, Total	NA	18	13	66	34
Antimony	NA 0.53	ND	ND	ND	ND
Arsenic, Total	0.52	ND	ND	ND	ND
Barium, Total	NA 0.5	ND	ND	ND	ND
Cadmium, Total	0.5	ND	ND	ND	ND
Chromium, Total	NA 40.4	0.7	0.4	0.5	0.4
Copper, Total Iron	12.1 NA	0.89 ND	0.84 ND	1 ND	1 ND
Lead, Total	26.2	0.25	0.24	0.23	0.21
Manganese	26.2   NA	0.25 ND	ND	0.23 ND	ND
Mercury	0.25	0.3	0.1	0.1	0.08
Molybdenum	NA I	ND .	ND	ND .	ND
Nickel. Total	NA I	ND	ND	ND	ND
Selenium	1.6	ND	ND	0.5	0.40
Silver	NA	ND ND	ND	ND	ND
Zinc, Total	NA.	22	20	24	20
Total PCBs (ug/kg)	950	102	63	ND	ND
Pesticides (ug/kg)					
4,4'-DDD	600	ND	ND	1.8	5.3
4,4'-DDE	29200	29	18	12	8.8
4,4'-DDT	3800	ND	ND	ND	ND
Aldrin	157	ND	ND	ND	ND
Alpha Chlordane	16600 ª	12	7	2.5	1.6
delta-BHC	NA .	ND	ND	ND	ND
Dieldrin	3700	ND	ND	3.8	2.8
Endosulfan I	195 <sup>b</sup>	ND	ND	ND	ND
Endosulfan II	195 b	ND I	ND	ND	ND
Endosulfan sulfate	165 b	ND	ND	ND	ND
Endrin aldehyde	150 °	ND	ND	ND	ND
Endrin ketone	150 °	ND	ND	ND	ND
Gamma Chlordane	16600 °	11	7	6.2	6.4
gamma-BHC (Lindane)	NA	ND	, ND	1.2	3.0
Heptachlor	5700	2.8	3.2	ND	ND
Heptachlor epoxide	3200	ND ND	ND	ND	ND
Methoxychior	128	ND	ND	ND	ND
SVOC (ug/kg)					
bis(2-ethylhexyl)phthalate	NA	97	89	47	59
Di-n-butylphthalate	NA I	ND	ND	ND ND	ND
Diethylphthalate	NA (	18	63	25	65
Acenaphthylene	NA NA	ND	ND	ND	ND
Fluoranthene	NA NA	ND	ND	ND	ND
Benzo(b)fluoranthene	NA	ND	ND	ND	ND
Benzo(k)fluoranthene	NA	ND	ND	ND	ND
Benzo(a)pyrene	23.9	ND	ND	ND	ND
Benzo(g,h,i)perylene	NA	ND	ND	ND	ND
Indeno(1,2,3-c-d)pyrene	NA	ND	ND	ND	ND
Dibenz(a,h)anthracene	NA	ND	ND	ND	ND
2,3,7,8-TCDD, TEQ, ug/kg	0.05	0.003	0.002 *	0.00069*	0.00045*

<sup>\*</sup>Maximum and Average TEQs for fish were used for comparison to benchmarks a Benchmark value is for Chlordane

b Benchmark value for Endosulfan was used

c Benchmark values for Endrin were used

Table 7-3

Comparison of Forage Fish Concentrations to Toxicity Benchmarks

Sauget Area I

<u> </u>	T.	Site	1	Reference	Reference
Compound	Benchmark	Maximum	Site Average	Maximum	Average
Herbicides (ug/kg)		1			
2.4-0	NA.	ND	ND	ND	ND
2.4-DB	NA NA	10	8.8	10	6.3
Dicamba	NA NA	2.6	11	ND	ND
Dichloroprop	NA NA	6.7	52.2	5.1	39
MCPA	NA.	3300	2800	2400	1350
MCPP	NA NA	ND	ND	ND	NID
Pentachiorophenol	9600	2.2	7.7	2.2	4.3
Metals (mg/kg)					
Aluminum, Total	NA NA	52	40	100	50
Antimony_	NA NA	ND	ND	ND	ND
Arsenic, Total	0.52	ND	ND	ND	ND
Banum, Total	NA .	ND	ND	ND	ND
Cadmium, Total	0.5	ND	ND	ND	ND
Chromium, Total	NA .	0.3	0.3	1.7	0.71
Copper, Total	12.1	2	1	0.75	0.54
iron	NA 26.2	ND 0.50	ND 0.35	ND 0.4	ND 0.3
Lead, Total	26.2	0.59	0. <b>3</b> 6	0.4 MD	0.3
Manganese	NA 0.25	ND 0.6	ND 0.2	ND 0.064	ND 0.053
Mercury Molybdenum	0.25 NA	0.6 ND	U.Z ND	0.064 NED	0.053 NID
Nickel, Total	NA NA	ND ND	ND ND	ND ND	ND ND
Selenium	1.6	0.54	0.44	0.65	0.42
Silver	NA NA	ND	ND	NID	NID
Zinc, Total	I NA	33	30	33	26
Total PCBs (ug/kg)	950	39	30	ND ND	ND ND
Pesticides (ug/kg)	+		- 30		140
4.4'-DDD	600	ND	ND	ND	NED
4.4'-DOE	29200	10	7.7	3.5	4.9
4.4'-ODT	3800	ND	ND ND	ND ND	ND
Aldnn	157	ND	ND	ND	NED
Alpha Chlordane	16600	ND	ND .	ND	NED
delta-BHC	NA NA	ND	ND	ND	NED
Dieldini	3700	ND	ND I	4.7	5.4
Endosultan I	195	ND	ND ND	NED	NED
Endosulfan II	195	ND I	ND	ND I	ND
Endosulian sulfate	NA	ND ND	ND ND	ND ND	ND
Endrin aldehyde	150	ND	ND	ND	ND ND
- · ·		_	j	ND ND	
Endrin ketone	150	ND NO	ND ND		ND
Gamma Chiordane	10000	ND	ND	1.2	3.2
gamma-BHC (Lindane)	NA 5700	ND ND	ND	ND NO	ND
Heptachlor Heotachlor eooxide	5700 3200	ND ND	ND ND	ND ND	ND ND
Methoxychior	128	ND ND	ND ND	ND DIN	ND ND
SVOC (ug/kg)	120	140	140		
SVOC (ug/kg) bis(2-ethylhexyl)phthalate	NA	230	183	280	172
Di-n-butylohthalate	NA I	ND ND	ND ND	ND ND	ND
Diethylphthalate	NA NA	37	31	37	61.3
Acenaphthylene	NA NA	ND	ND	ND	ND
Fluoranthene	NA NA	ND	ND	ND	ND
Benzo(b)Muoranthene	NA NA	ND	ND	ND ND	NO
Benzo(k)fluoranthene	NA	ND	ND	ND ND	NO
Benzo(a)pyrene	23.9	ND	ND	ND	ND I
Benzo(g,h,i)perylene	NA NA	ND	ND	ND	ND
indeno(1,2,3-c-d)pyrene	NA I	54	103	ND	NO
Dibenz(a,h)anthracene	NA	48	101	ND	NED
2.3.7.8-TCDD. TEQ, ug/kg	0.05	0.001	0.00085	0.0014	0.00096

<sup>\*</sup> Maximum and Average TEQs for fish was used for companson to benchmark

a Benchmark value is for Chlordane

b Benchmark value for Endosulfan was used

c Benchmark values for Endnin were used

### Table 7-4 Whole Body Toxicity Values for Fish Sauget Area 1

Herbicides Pentachlorophenol	Fathead minnow		(mg/kg)	Reps	Effect	Endpoint	Route	Body Part	Stage
Pentachlorophenol									
	Cathand minarius	PCP	22.1	1	Growth	LOED	Combined	Whole Body	Embryo
	Fathead minnow	PCP	12.6	1	Growth	NOED	Combined	Whole Body	Embryo
	Largemouth Bass	PCP	9.6	5	Growth	LOED	Absorption	Whole Body	Immature
	Trout - Rainbow	PCP	13.8	4	Mortality	ED100	Absorption	Whole Body	Adult
Metals				<u>}</u>			<del></del>		<del>}</del>
Arsenic	Bluegill	Arsenic	0.52	5	Mortality	NOED	Absorption	Whole Body	Immature
Cadmium	Guppy	Cadmium	0.5	2	Growth	LOED	Ingestion	Whole Body	Immature
Copper	Common carp	Copper	12.1	1	Morphology; Mortality	LOED	Combined	Whole Body	Egg
Соррег	Common carp	Copper	12.1	1 1	Reproduction	NOED	Combined	Whole Body	Egg
		· · · · · · · · · · · · · · · · · · ·							
Lead	Fathead minnow	Lead	26.2	<u>1</u>	Behavior	LOED	Absorption	Whole Body	Immature
	Fathead minnow	Lead	26.2	1	Behavior, Physiological	NOED	Absorption	Whole Body	Immature
46	Walleye	Mercury	0.25	22	Cellular, Developmental , Physiological	LOED	Ingestion	Whole Body	Immature
Mercury	Walleye	Mercury	0.25	22	Mortality	NOED	Ingestion	Whole Body	Immature
	vvalleye	INIGICUI y		<del></del>	Mortality	INOLD	IIIgosaon	Whole body	Illindialo
Selenium	Bluegill	Selenium	4.6	6	Mortality	LOED	Combined	Whole Body	Adult
- Ocicinain	Fathead minnow	Selenium	12.2	3	Growth	LOED	Ingestion	Whole Body	Larval
	Fathead minnow	Selenium	10.3	3	Growth	NOED	Ingestion	Whole Body	Larval
	Bluegill	Selenium	1.6	5	Cellular	LOED	Combined	Whole Body	Immature
	Bluegill	Selenium	4.3	3	Mortality	NOED	Absorption	Whole Body	Immature
	Largemouth Bass	Selenium	3	3	Mortality	NOED	Absorption	Whole Body	immature
PCBs and Pesticides			-	·_ ·_ ·_					
PCBs									
	Catfish-Channel	PCBs	14.3	3	Growth, Morphology	LOED	Ingestion	Whole Body	Immature
	Pinfish	PCBs	2.2	2	Mortality	LOED	Absorption	Whole Body	Immature
	Pinfish	PCBs	0.98	10	Mortality	NOED	Absorption	Whole Body	Immature
	Pinfish	PCBs	3.8	10	Mortality	NOED	Absorption	Whole Body	Immature
	Catfish-Channel	PCBs	10.9	3	Mortality	NOED	Ingestion	Whole Body	Immature
	Catfish-Channel	PCBs	14.3	3	Mortality	NOED	Ingestion	Whole Body	Immature
	Redbreast sunfish	PCBs	0.95	field study	Reproduction; Growth	NOED	Field study	Whole Body	Adult
	Redbreast sunfish	PCBs	0.95	field study	Reproduction; Growth	NOED	Field study	Whole Body	Adult
	Redbreast surfish	PCBs	0.95	field study	Reproduction; Growth	NOED	Field study	Whole Body	Adult

Table 7-4
Whole Body Toxicity Values for Fish
Sauget Area 1

Compound	Species Common Name	Chemical Common Name	Concentration -Wet (mg/kg)	Reps	Effect	Endpoint	Exposure Route	Body Part	Start Life Stage
DDD	Fathead minnow	4,4'-ODD	0.6	1	Reproduction	LOED	Combined	Whole Body	Adult
DDE	Mosquito fish	4,4'-DDE	29 2	1	Mortality	NOED	Combined	Whole Body	NA
דממ	Fathead minnow	4,4'-DDT	3 8	1	Reproduction	LOED	Combined	Whole Body	Adult
Aldrin	Mosquito fish	Aldrin	0.157	1	Mortality	NOED	Combined	Whole Body	NA NA
Dieldrin	Bluegill	Dieldrin	3.7	5	Behavior	LOED	Absorption	Whole Body	Immature
Endosult <b>an</b>	Pinfish	Endosulfan	0 195	1	Mortality	NOED	Combined	Whole Body	Mature
Endrin	Golden Shiner	Endrin	0.15	3	Behavior	LOED	Absorption	Whole Body	l NA
	Mosquito fish	Endrin	34	1	Mortality	LOED	Combined	Whole Body	NA
	Catfish-Channel	Endrin	0.41	1	Mortality	NOED	Absorption	Whole Body	Immature
Chlordane	Pinfish	Chlordane	16.6	2	Mortality	LOED	Combined	Whole Body	Adult
Hoptachlor	Pinfish	Heptachlor	5.7	1	Mortality	NOED	Combined	Whole Body	Mature
deptachlor opexide	Pinfish	Haptachlor apoxide	3 2	1	Mortality	NOED	Combined	Whole Body	Mature
Methoxychlor	Mosquito fish	Methoxychlor	0 128	1	Mortality	NOED	Combined	Whole Body	NA
SVOCs		1				ł			1
Benzo(a)pyrene	Gizzard Shad	Benzo[a]pyrene	0 0283	2	Physiological	LOED	Absorption	Whole Body	Adult
	Gizzard Shad	Benzo(a)pyrene	0.0239	2	Physiological	NOED	Absorption	Whole Body	Adult
					Behavior, Cellular, Morphology,				
Dioxin	Common carp	2,3,7,8-TCDD	0.0022	1	mortality Growth,	LOED	Absorption	Whole Body	Adult
	Yellow perch	2,3,7,8-TCDD	0.000143	6	Morphology, Mortality	NOED	Ingestion	Whole Body	Immature
	Lake trout	2,3,7,8-TCDD	0.00005	NA NA	Mortality	NOED	Absorption	Whole Body	Based on eq

If multiple values are available, selected value is bold and in Italics.

### Table , -4 Whole Body Toxicity Values for Fish Sauget Area 1

Compound	Year	Author	Journal
Herbicides			
ntachlorophenol	1985		Environmental Toxicology and Chemistry, Vol. 4, pp 389-397, 1985
	1985	Spehar, R.L., Nelson, H.P., Swanson, M.J., Renoos, J.W.	Environmental Toxicology and Chemistry, Vol. 4, pp 389-397, 1985
			Aquat. Toxicol. 6:157-164.
	1991	Mckim, J.M. and P.K. Schmieder	p. 161-188 in Nagel, R.et.al. Bioacc. in Aquatic Systems, Contrib. to Assmt. Proceedings
Metals			
Arsenic	1980	Barrows, M.E., S.R. Petrocelli, K.J. Macek and J.J. Carroll	p. 379-392 in Haque, R., ed. Dynamics, Exposure and Hazard Assessment of Toxic Chemicals
Cadmium	1982	Hatakeyama, S. and M. Yasuno	Bull. Environ. Contam. Toxicol. 29:159-166.
Copper	1996	Stouthart, J.H.X., Haans, J.L.M., Lock, R.A.C., Bonga, S.E.W.	Environmental Toxicology and Chemistry, Vol. 15, No. 3, pp. 376-383 (1996)
	1996	Stouthart, J.H.X., Haans, J.L.M., Lock, R.A.C., Bonga, S.E.W.	Environmental Toxicology and Chemistry, Vol. 15, No. 3, pp. 376-383 (1996)
	4004	Water D.M. Breeze A. Cooks D.B. C. L. D.E.	
Lead	1991	Weber, D.N., Russo, A., Seale, D.B., Spieler, R.E.	Aquatic Toxicol. 21: 71-80
	1991	Weber, D.N., Russo, A., Seale, D.B., Spieler, R.E.	Aquatic Toxicol. 21: 71-80
Mercury	1996	Friedmann, A.S., M.C. Watzin, T. Brinck-Johnsen and J.C. Leiter	Aquat. Toxicol. 35:265-278.
Mercury	1996	Friedmann, A.S., M.C. Watzin, T. Brinck-Johnsen and J.C. Leiter	Aquat. Toxicol. 35:265-278.
Selenium	1992	Hermanutz, R.O., Allen, K.N., Roush, T.H., and S.F. Hedtke	Environ. Tox. Chem. 11: 217-224
		Bennett, W.N., A.S. Brooks and M.E. Boraas	Arch. Environ. Contam. Toxicol. 15:513-517.
	1986	Bennett, W.N., A.S. Brooks and M.E. Boraas	Arch. Environ. Contam. Toxicol. 15:513-517.
		Lemly, A.D.	Aquat. Toxicol. 27:133-158.
		Lemly, A.D.	Aquat. Toxicol. 2:235-252.
	1982	Lemly, A.D.	Aquat. Toxicol. 2:235-252.
PCBs and			
Pesticides PCBs			
7 020	<u> </u>		
		Hansen, L.G., W.B. Wiekhorst and J. Simon	J. Fish. Res. Bd. Can. 33:1343-1352.
		Hansen, D.J., P.R. Parrish and J. Forester	Environ. Res. 7:363-373.
		Duke, T.W., J.I. Lowe and A.J. Wilson, Jr.	Bull. Environ. Contam. Toxicol. 5:171-180.
		Duke, T.W., J.I. Lowe and A.J. Wilson, Jr.	Bull. Environ. Contam. Toxicol. 5:171-180.
		Hansen, L.G., W.B. Wiekhorst and J. Simon	J. Fish. Res. Bd. Can. 33:1343-1352.
	1976	Hansen, L.G., W.B. Wiekhorst and J. Simon	J. Fish. Res. Bd. Can. 33:1343-1352.
		Adams, S.M., K.L. Shepard, M.S. Greeley Jr., B.D. Jimenez, M.G. Ryon,	Marina Caulin mantal Dassanth 20, 450 464
	1989	L.R. Ghugart, and J.F. McCarthy;	Marine Environmental Research. 28: 459-464.
	1	Adams OM LD Observed O.D. Coultsweeth and D.E. Lifety	In J.F. McCarthy and L.R. Shugart, eds., Biomarkers of Environmental Contamination. Lewis
	1990	Adams, S.M., L.R. Shugart, G.R. Southworth and D.E. Hinton Adams, S.M., W.D. Crumby, M.S. Greeley, Jr., M.G. Ryon, and E.M	Publishers, Boca Raton, FL., pp. 333-353.
	4000		Environmental Taxicalogy and Chemieta, 11: 1540 1557
	1992	Schilling	Environmental Toxicology and Chemistry. 11: 1549-1557.

Table 7-4
Whole Body Toxicity Values for Fish
Sauget Area 1

Compound	Year	Author	Journal
, ppp.	1977	Jarvinen, A.W., M.J. Hoffman, and T.W. Thorslund	J Fish Res Board Can 34 2089-2103
DD€	1974	Metcaff, R L	р 17-38 in Hayes, W J, Essays in Toxicology, Volume 5 Academic Press
DDT	1977	Jarvinen, A.W., M.J. Hoffman, and T.W. Thorslund	J Fish Res Board Can 34 2089-2103
Aldrın	1974	Metcalf, R L	p. 17-38 in Hayes, W.J., Essays in Toxicology, Volume 5. Academic Press
Dieldrin	1967	Gakstatter, J.H. and C.M. Weiss	Trans Amer Fish Soc 96 301-307
Endosullan	1977	Schimmel, S.C., Patrick, J.M., Wilson, A.J.	Aquatic Toxicology and Hazard Evaluation, ASTM STP 634, American Society for Testing and Materials, pp. 241-252 (1977)
Endrin	1973	Ludke, J.L., D.E. Ferguson and W.D. Burke Metcalf, R.L., I.P. Kapoor, P.Y. Lu, C.K. Schuth and P. Sherman Argyle, R.L., Williams, G.C., and H.K. Dupree	Trans Amer Fish Soc 97 260-263 Environ Health Perspect 8 35-44 J Fish Res Board Can 30 1743-1744
Chlordane	1976	Parrish, P.R., S.C. Schimmel, D.J. Hansen, J.M. Patrick, and J. Forester	Journal of Toxicology and Environmental Health, 1 485-494, 1976
Heptechlor	1976	Schimmel, S.C., Patrick, J.M., Forester, J.	Journal of Toxicology and Environmental Health, 1.955-965, 1976
Heptachlor epoxide	1976	Schimmel, S.C., Patrick, J.M., Forester, J.	Journal of Toxicology and Environmental Health, 1 955-985, 1976
Methoxychlor	1974	Metcalf, R L.	p. 17-38 in Hayes, W.J., Essays in Toxicology, Volume 5 Academic Press
SVOCs Benzo(a)pyrene		Levine, S.L., J.T. Oris and T.E. Wissing Levine, S.L., J.T. Oris and T.E. Wissing	Aquat Toxicol 30 61-75. Aquat Toxicol 30 61-75.
Dioxin	1991	Cook, P.M., D.W. Kuehl, M.K. Walker and R.E. Peterson	p. 143-167 in Gallow, M.A., et.al. Biol. Basis for Risk Assmt. of Dioxins and Related Compounds.
	1986	Kleeman, J.M., J.R. Olson, S.M. Chen and R.E. Peterson	Toxicol. Appl. Pharmacol. 83:402-411.
	1993	USEPA	EPA/600/R-93/055

If multiple values are available, selected value is bold and in Italics.

Table 7-5
Comparison of Dead Creek Segment F Surface Water Concentrations to Criteria
Sauget Area I

<del>-</del>							Wa	ter Qualit	y Benchmark	
Sample ID: Compounds <sup>6</sup>	SW-CSF-S1 Concentration	ER Q	SW-CSF-S2 Concentration	ER Q	SW-CSF-S3 Concentration	ER Q	Acute		Chronic	
Total Metals (mg/l) - non-filtered				$\vdash$			7.104.15		011101110	
Aluminum	0.039	J	0.15	l t	0.55	[	0.75	2,c	0.087	2 c
Arsenic	0.01	υ	0.0032	J	0.0049	J	0.36	1	0.19	1
Barium	0.13	i I	0.13	1	0.12		0.11	3	0.004	3
Copper Iron	0.0016 0.5	J	0.002 0 55	J	0.012 1	J	0.044	1,a	0 027 1	1,a 2
Lead	0.005	υ	0.0022	J	0.0037	J	0.33	1,a	0 069	1.a
Manganese	0.082	J	0.1	J	0.14	J	2.3	3	0.12	3
Molybdenum	0.01	l n	0.01	U	0.0028	J	16	3	0.37	3
Nickel	0.0069	J	0.013	J	0 021	J	1.1	2,ь	0.12	2.6
Zinc	0.0073	J	0.035		0.075		0.27	2,b	0.27	2.b
SVOC (ug/l)	1			1						
Fluoranthene	0.7	J	10	U	10	υ			15	4
Dioxins (ug/l) 2,3,7,8-TCDD TEQ Mammal <sup>5</sup>	9.01197E-06		1.5012E-06		1.5583E-06					

<sup>1</sup> Illinois Water Quality Standards

bolded values indicate exceedance of chronic Water Quality Benchmarks shaded values indicate exceedance of acute Water Quality Benchmarks

Hardness dependent criteria calculated at an average hardness for Creek Section F of 263 mg/l as CaCO<sub>3</sub>.

<sup>&</sup>lt;sup>2</sup> US Environmental Protection Agency. 1999. National Recommended Water Quality Criteria—Correction. Office of Water, Washington, DC. April 1999. EPA 822-Z-99-001

<sup>&</sup>lt;sup>3</sup> Suter, GW, CL Tsao. 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. Prepared for U.S Department of Energy. Oak Ridge National Laboratory. June 1996. ES/ER/TM-96/R2.

<sup>&</sup>lt;sup>4</sup> Suter, GW, CL Tsao. 1996 Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. Prepared for U.S. Department of Energy. Oak Ridge National Laboratory. June 1996. ES/ER/TM-96/R2

<sup>&</sup>lt;sup>5</sup> Fish TEQ values were calculated for 2,3,7,8-TCDD

<sup>&</sup>lt;sup>6</sup> Other COPCs were not detected in Dead Creek Sector F surface water

<sup>&</sup>quot;a" Calculated values for Illinois criteria are based on average hardness

<sup>&</sup>quot;b" NAWQ Criteria for metals are calculated based on hardness

<sup>&</sup>quot;c" At pH 6.5 - 9.0, see G, I, and L under National recommended water quality criteria for non priority pollutants

Table 7-6
Comparison of Borrow Pit Surface Water Concentrations to Criteria
Sauget Area I

		T -					Wa	er Quali	ty Benchmark	
Sample ID:	SW-BPL-S1 Concentration	ER Q	SW-BPL-S2 Concentration	ERQ	SW-BPL-S3 Concentration	ER Q	Acute		Chronic	
Total Metals (mg/l) non-filtered	<del></del>	+	<del></del>				Acute		Chronic	
Aluminum	3.4		0.71		0.65		0.75	2,d	0.087	2.d
Arsenic	0.015		0.0079	J	0.012		0.75	1	0.087	1
Barium	0.32		0.12	"	0.045		0.11	3	0.19	3
Chromium	0.0041	J	0.01	U	0.01	U	4.036/.016	1,8	0.481/.011	1,a
Copper	0.0074	J	0.0036	J	0.0048	J	0.0468	1,8	0.0285	1,a
Iron	8.7	J	1.6	J	1.3	j	0.5		1	2
Lead	0.02	}	0.002	J	0.0029	ا ر ا	0.355	1,a	0.0744	1.a
Manganese	1.7		0.13		0.17		2.3	3	0.12	3
Molybdenum	0.0035	J	0.01	U	0.004	J	16	3	0 37	3
Nickel	0.015	J	0.012	J	0.0077	J	1.1	2,0	0 12	2.b
Zinc	0.048		0.027		0.017	J	0.287	2.b	0.287	2.b
Pesticides (ug/l)										
delta-BHC	0.00013	J	0.0022	J	0.012	U	39	3.g	2.2	3.g
Dieldrin	0.1	U	0.1	U	0.001	J	0.24	2	0.056	2
Endosulfan I	0.0024	J	0.05	U	0.0015	J	0 22	2.e	0.056	2.e
Endosulfan sulfate	0.1	U	0.1	U	0.0032	J	0.22	2.e	0.056	2.€
Endrin	0.1	U	0.1	U	0.00095	J	0.086	2.c	0.036	2.c
Endrin aldehyde	0.0032	J	0.1	ļυ	0.0016	J	0.086	2,c	0.036	2 c
Endrin ketone	0.1	U	0.1	U	0.0027	J	0.086	2,c	0.036	2.c
gamma-BHC (Lindane)	0.019	U	0.0038	J	0.0024	J	0.95	2	0.036	2.c
Heptachlor	0.0026	J	0.0022	J	0.0029	J	0.52	2	0.0038	2
Heptachlor epoxide	0.00096	J	0 0009	J	0.05	U	0.52	2	0.0038	2
Dioxins (ug/l) 2,3,7,8-TCDD TEQ Mammal <sup>h</sup>	8.5902E-07		7.453E-07		4.8413E-07					

<sup>1</sup> Illinois Water Quality Standards

Only those COPCs detected in the Borrow Pit are shown

boided values indicate exceedance of chronic Water Quality Benchmarks shaded values indicate exceedance of acute Water Quality Benchmarks

Hardness dependent criteria calculated at an average hardness for the Borrow Pit Lake of 280 mg/l as CaCO<sub>3</sub>

<sup>&</sup>lt;sup>2</sup> US Environmental Protection Agency. 1999. National Recommended Water Quality Criteria—Correction. Office of Water, Washington, DC. April 1999. EPA 822-Z-99-001.

<sup>&</sup>lt;sup>3</sup> Suter, GW, CL Tsao. 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota: 1996 Revision. Prepared for U.S. Department of Energy. Oak Ridge National Laboratory. June 1996. ES/ER/TM-96/R2.

<sup>&</sup>quot;a" Calculated values for Illinois criteria are based on average hardness

<sup>&</sup>quot;b" NAWQ Criteria for metals are calculated based on hardness

<sup>&</sup>quot;c" there is some uncertainty since the detection limit is greater than the AWQC

<sup>&</sup>quot;d"At pH 6.5 - 9.0, see G, I, and L under National recommended water quality criteria for non priority pollutants

<sup>&</sup>quot;e" For alpha- and beta-Endosulfan

<sup>&</sup>quot;f" For PCBs

<sup>&</sup>quot;g" For BHC (other)

<sup>&</sup>quot;h" Mammal TEQ values were calculated for 2,3,7,8-TCDD

# Table 7-7a Comparison of Sediment Concentrations in Dead Creek Section F to Ecological Sediment Quality Guidelines Sauget Area!

				_	- Alcui			
Sample ID:	SED-CSF-S1- 0 2FT		SED-CSF-S2- 0 2FT		SED-CSF-S3- 0 2FT		Sediment	
sample ID.				·			Quality	Sediment Quality
Compounds	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Guidelines <sup>1</sup>	Guidelines <sup>1</sup> Consensus
						$\vdash$	Consensus-based TEC	based PEC
Herbicides (ug/kg)	110	l l	040	l		1		
2,4-D	110	UJ	210	UJ	23	J	NΛ	NA.
Metals (mg/kg) Aluminum	7800	1.1	44000	ĺ. I		1.1		
Arsenic	8	J	14000	J	17000	J	NA	, NA
Arsenic Barium	150	J	19 250	J	15	J	9 79	33
	0.53	J		J	270	J	NA	NA NA
Beryllium Cadmium		ر پر	0.85	J	0.89	J	NA	ļ NA
<del>-</del>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	* J ∄	47 ()	J	14	J.	0.99	4 98
Chromium	19	J	38	J	30	J.	43.4	111
Copper	I.	J	410	/3	240	j û	31.6	149
ron	14000	J	22000	J	26000	J	20000 <sup>2</sup>	40000 <sup>2</sup>
.ead	110	J	S 320	J	110	J	35.8	128
Manganese	170	J	230	J	510	[ J	460 <sup>2</sup>	1100 -
Mercury	0.3	J	7 - 77 <b>24 3</b> 1 1 1 1 1 1 1 1	J	0.45	J	0.18	1.06
Molybdenum	0.7	J	3.7	J	0 76	J	NA	i
lickel	90 700	: J :	390	Ú	180	1.20	22.7	48 6
Zinc	950	J	3700	J	1600	ં પ્ર	121	459
PCBs and Pesticides (ug/kg)		1				1		
Total PCBs	83	J	83	J	120	UJ	59.8	676
1,4'-DDT	4.5	J	35	UJ	24	UJ	4.16 <sup>3</sup>	62 9 <sup>3</sup>
Total DDT	19	J	43	j	27	J	5.28	572
Aldrin	4.1	J	18	UJ	12	UJ	2 <sup>2</sup>	320, 1120, 488 <sup>2.5</sup>
Alpha Chlordane	4.6	J	5.3	J	0.84	J	3.24 4	17.6 4
delta-BHC	0.34	J	5.3	UJ	3.7	UJ	NA	NA.
Dieldrin	9.3	Ĵ	35	ÜĴ	0 99	Ĵ	1 9	61.8
Endosulfan I	5 7	J	2	J	12	Ĵ	NA	NA.
Endosulfan II	8.1	از ا	5.5	J	18	انا	NA	NA NA
Endosulfan sulfate	28	ĺĵ	35	ŪJ	24	UJ	NA	l NA
Endrin	17	l i	35	UJ	1.7	J	2.22	207
Endrin aldehyde	14	l j	9	J	3 6	J	NA NA	l NA
Endrin ketone	10	ľ	7.2	Ĵ	3.8	l j l	NA	NA NA
Gamma Chlordane	17	j	7.5	Ĵ	2.4	انا	3 24 4	17.64
Heptachlor	7.8	UJ	18	UJ	0.93	ازا	0 3 NEL 2	NA NA
	5.4	J	18	UJ	0.93	J	2.47	16
Heptachlor epoxide	24	J	14	J	73	j	2.47 NA	NA NA
Methoxychlor	24	1	14	1	'3	'	NA.	l NA
SVOC (ug/kg) Fluoranthene	120	J	890	UJ	130	J	423	2230
Dioxins (ug/kg) 2,3,7,8-TCDD TEQ Mammal <sup>6</sup>	0.144391		0.3318165		0.170232		NA	NA

NA indicates not available.

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Environ.

shaded numbers exceed PEC value

Persaud, D., R. Jaagumagi, and A. Hayton. 1993 Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Ontario Ministry of Environment and Energ

Guidelines for sum DDT

<sup>&</sup>lt;sup>4</sup> Guidelines for Chlordane

<sup>5</sup> Ontario SEL value is site specific based on TOC value

Mammal TEQ values were calculated for 2,3,7,8-TCDD

bolded numbers exceed TEC value, or Ontario LEL or NEL value

Table 7-7b

Comparison of Industry Specific Sediment Concentrations in Dead Creek Sector F to Sediment Quality Guidelines
Sauget Area I

SAMPLE ID: Compounds	Sediment Quality Guidelines <sup>1</sup> Consensus-based TEC	Guidelines <sup>1</sup>	FASED-CSF- S1E-0-8IN Concentration		FASED CSF S2 0-7IN Concentration		FASED CSF- S3E-0-6IN Concentration		FASED-CSF-S4 0-7IN Concentration		FASED-CSF- S5W-0-10IN Concentration	ER Q	FASEŪ-ŪSF- S6E-0-10IN Concentration	ER Q	FASED-CSF- S7E-0-11IN Concentration	ER Q
Copper (mg/kg dw) Zinc (mg/kg dw) Total PCBs (ug/kg)	121	149 459 676	17 88 25	U	12 53	<i>p</i> 1.	17 63 22	U	10 50 22	U	13 62 52 95		17 85 24	U	21 84 23	U

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000 Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Arch. Environ* Bolded numbers exceed TEC value or Ontario LEL value Shaded numbers exceed PEC value

Table 7-7b Comparison of Industry Specific Sediment Concentrations In Dead Creek Sector F to Sediment Quality Guidelines Sauget Area I

	Sediment Quality	Sediment Quality																	-	
1	Guidelinos <sup>1</sup>	Guidelines <sup>1</sup>	FASED CSF SB		FASED CSF S9		FASED CSF		FASED CSF		FASED CSF		FASED CSF	]	FASED-CSF-	!	FASED-CSF-		FASED-CSF-	!!
SAMPLE ID:	Consensus-based	Consensus-based			0-11IN	1	S13W-0-15IN		S12-0-15INFD		S11W-0-10IN		S14W-0-15IN		S10-0-9IN		S15W-0-28IN		S16-0-23IN	1 1
Compounds	TEC	PEC	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q
					!								,							
Copper (ing/kg dw)	31.6	149	34		78		370		76		88		460	}	33	1	430 "	1	33	1 1
Zinc (mg/kg dw)	121	459	160		400		2100	14.0	685		690	, ,,	3200		250		7700		3900	
Total PCBs (ug/kg)	59 8	676	24	U	29	U	290		28	U	29	U	457.35		25	U_	704.5	J	75.95	1

<sup>&</sup>lt;sup>1</sup> MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Arch. Environ* Bolded numbers exceed TEC value or Ontano LEL value Shaded numbers exceed PEC value.

### Table 7-7b Comparison of Industry Specific Sediment Concentrations in Dead Creek Sector F to Sediment Quality Guidelines Sauget Area I

	Sediment Quality	Sediment Quality																		
\ \ \	Guidelines <sup>1</sup>	Guldelines <sup>1</sup>	FASED CSF	}	FASED-CSF-	i	FASED-CSF-	i	FASED-CSF-		FASED-CSF-		FASED-CSF-		FASED-CSF-	ļ ·	FASED-CSF-	1	FASED-CSF-	1 1
SAMPLE ID:	Consensus-based	Consensus-based		- 1	S18E-0-14IN		S19-0-13IN	ì .	S20-0-12IN		S21-0-13INFD		S22E-0-20IN		S23-0-15IN		\$24W-0-13IN		S25E-0-10IN	1 1
Compounds	TEC	PEC	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q
			1. 35 m. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	2		. 500			73.3		4 days		and he stage grades	Ψ <sup>2</sup> .		\$ 37			10	[: "]
Copper (mg/kg dw)	316	149	1400		- 1700 A	4.0	5400	100 C	710	.0	1060	1877 P	17 420 W	1	1400	100	530	1.	2500	
Zinc (mg/kg dw)	121	459	11000	37 B	9100		10000	N 1	2300	8	4450	1. 6	4800	1.55	5400	3	3200		6200	1: 1
Total PCBs (ug/kg)	59 ଖ	676	484.05		289.6		1249,4	136	486.8		663,15	l	1101.2	1	1403.5	İ	244.75	I	1049.6	

<sup>&</sup>lt;sup>1</sup> MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment. Quality Guidelines for Freshwater Ecosystems. *Arch. Environ.* Bolded numbers exceed TEC value or Ontario LEL value. Shaded numbers exceed PEC value.

Table 7-7b

Comparison of Industry Specific Sediment Concentrations In Dead Creek Sector F to Sediment Quality Guidelines
Sauget Area I

	Sediment Quality	Sediment Quality								
	Guidelines <sup>1</sup>	Guidelines <sup>1</sup>	FASED CSF		FASED CSF		FASED-CSF-		FASED-CSF-	. !
SAMPLE ID:	Consensus-based	Consensus-based	S26W-0-13IN		S27E-0-16IN		S28-0-10IN		S29W-0-10IN	
Compounds	TEC	PEC	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q
			14.3 <b>%</b>	2.782		4,23	1980 M. C. GOV.	33.2		
Copper (mg/kg dw)	316	149	930		1900		1200	2013	26	
Zinc (mg/kg dw)	121	459	4700	134	39 8200	4233	3200	3.15	510	Sec.
Total PCBs (ug/kg)	59 8	676	581.2		1811	. , .	6470.5		24	UJ

<sup>&</sup>lt;sup>1</sup> MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Arch. Environ* Bolded numbers exceed TEC value or Ontario LEL value Shaded numbers exceed PEC value.

Table 7-8a Comparison of Ecological Borrow Pit Lake Sediment Concentrations to Sediment Quality Guidelines Sauget Area I

Sample ID	BPL-ESED-S1-0 2FT Average Concentration	ER Q	BPL-ESED-S2-0 2FT Concentration	ER Q	BPL-ESED-S3-0 2FT Concentration	ER Q	Sediment  Quality  Guidelines <sup>1</sup> Consensus-based TEC	Sediment Quality Guidelines <sup>1</sup> Consensus-based PEC
Herbicides (ug/kg) 2.4-D	88	١.						
Metals (mg/kg)	88	J	24	กา	11	J	NA	NA
Aluminum	14000	J	16000	l j [	11000	1.1		
Arsenic	17	.1	17		11000	1 1	NA NA	NA aa
Banum	390	1	420	J	240	!	9 79	33
Beryllium	0.74	Ιĭ	0 82	ı l	0.58	J	NA	NA NA
Cadmium	2	1 3	2.7	1	1.6		NA 0.99	NA 100
Chromium	21	Į j	26	j	1.6	1	0 99 43 4	4 98
Copper	46	ľů	64	J	36	J	43.4 31.6	111 149
Iron	36000	Ιŭ	38000	J	28000	',	20000 <sup>2</sup>	
Lead	52	ľű	58	ایا	34	J	20000 ° 35 8	40000 ²
Manganese	1300	J	1400	, -	940	J '	460 <sup>2</sup>	128
Mercury	0.1	ا ا	0 16	J	0.11	J		1100 ²
Molybdenum	0.5	l ü	0.92	J	0 11	J .	0 18	1 06
Nicket	53	Ü	54	J	35	j	22 7	40.0
Silver	2.8	UJ	0.79	ایا	25	ا رن ا	22 /	48 6
Zinc	310	] 03	370	J	250 250	J	121	459
Pesticides (ug/kg)	310	1	370	,	250	1 ,	121	459
4.4'-DDE	1.1	ر ا	3.2	ا ر ا	1.6	l . i	3 16 b	313 <sup>b</sup>
	1.1			l 1		J	4.16 <sup>3</sup>	6293
4,4'-DDT	11 22	\ \rac{1}{1}	19	Oi	1,4 3	1 1		
Total DDT		J	22	J		J	5 28	572
Alpha Chlordane	0 48	J	3 2	J	12	J.	3 24 4	176
Dieldnn	0.26	J	0.5	J	18	UJ	19	618
Endosulfan I	4.9	J	2.8	J	1	J		
Endosulfan sulfate	9.5	l i	1.4	1	18	- nh		Į.
Endrin aldehyde	1 4	J	2 2	J	12	J		
Endnn ketone	0.72	J	19	UJ	18	UJ		
Gamma Chlordane	0 74	J	3	J	9 4	UJ	3 24 4	17 6 ⁴
gamma-BHC (Lindane)	4.8	J	99	ŲĴ	9.4	UJ	2 37	4 99
Heptachlor epoxide	4.8	J	99	UJ	9 4	UJ	2 47	16
Dioxins (ug/kg) 2,3,7,8-TCDD TEQ Mammal <sup>5</sup>	0.0134195				0 0194186			

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2009. Development and Evaluation of Consensus Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch Environ Contamin Toxicol 39 20-31

Persaud, D., R. Jaagumagi, and A. Hayton. 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontano. Ontano Ministry of Environment and Energy August, 1993

3 Guidelines for sum DDT

Guidelines for Chlordane

Mammal TEQ values were calculated for 2,3,7.8-TCDD

bolded numbers exceed TEC value or Ontario LEL value shaded numbers exceed PEC value

Table 7-8b Comparison of Industry Specific Borrow Pit Lake Sediment Concentrations to Sediment Quality Guidelines Sauget Area I

Sample ID: Compounds	Sediment Quality Guidelines <sup>1</sup> Consensus-based TEC	Sediment Quality Guidelines <sup>1</sup> Consensus-based PEC	FASED-BPL-S1- 0-10IN		FASED-BPL-S2 0-10IN Concentration	l	FASED-BPL-S3 0-8IN Concentration	Ì '	FASED-BPL-S4 0-10IN Concentration		FASED-BPL-S5- 0-9IN Concentration	FASED-BPL-S6- 0-11IN DUP avgd. Concentration	
Copper (mg/kg dw) Zinc (mg/kg dw)	31.6 121	149 459	9.9 <b>380</b>		15 <b>230</b>		14 300		13 <b>360</b>		13 <b>280</b>	17 <b>335</b>	

<sup>&</sup>lt;sup>1</sup> MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Environ. Bolded numbers exceed TEC value or Ontario LEL value Shaded numbers exceed PEC value

Only compounds detected at least once in this medium in this area are shown on this table.

Table 7-8b

Comparison of Industry Specific Borrow Pit Lake Sediment Concentrations to Sediment Quality Guidelines
Sauget Area I

Sample ID:	Sediment Quality Guidelines <sup>1</sup> Consensus-based	Sediment Quality Guidelines 1 Consensus-based	FASED-BPL-S7- 0-9IN		FASED-BPL-S8- 0-9IN	
Compounds	TEC	PEC	Concentration	ER Q	Concentration	ER Q
Copper (mg/kg dw)	31 6	149	18		21	
Zinc (mg/kg dw)	121	459	410	ļ	490	1.57

<sup>&</sup>lt;sup>1</sup> MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Environ. Bolded numbers exceed TEC value or Ontario LEL value Shaded numbers exceed PEC value Only compounds detected at least once in this medium in this area

Table 7-9
Number of Taxa, Number of Organisms, and Three Dominant Taxa in Dead Creek Section F and Borrow Pit Lake Samples
Sauget Area I

Location 2	Station Station	Number of Organisms	Number of Taxa	Dominant Taxon*	2nd Dominant Taxon	3rd Dominant Taxon	Total Organic Carbon, percent
	F-1	156	16	Chironomidae	Sphaeriidae	Chironomidae	4.0
Dead Creek Section F	F-2	154	11	Ceratopogonidae	Oligochaeta	Ceratopopogonidae	14
	F-3	358	17	Oligochaeta	Oligochaeta	Chironomidae	6.1
	BP-1	126	18	Oligochaeta	Odonata	Oligochaeta	6.7
Borrow Pit Lake	BP-2	262	17	Oligochaeta	Oligochaeta	Ceratopogonidae	4.5
	BP-3	151	14	Oligochaeta	Oligochaeta	Oligochaeta	3.3
Prairie du Pond Creek	PDC-1	92	8	Oligochaeta	Ceratopogonidae	Oligochaeta	1.2
(Reference Area 1)	PDC-2	148	9	Oligochaeta	Chaoboridae	Oligochaeta	2.3
Reference Area 2	REF2-1	4420	16	Oligochaeta	Ceratopogonidae	Chironomidae	1.3
Reference Area 2	REF2-2	87	13	Oligochaeta	Ceratopogonidae	Chironomidae	2.0

<sup>\*</sup>Dominant taxa were calculated at the genus or species level but expressed as higher taxa.

Table 7-10

Diversity Indices for Dead Creek Section F, the Borrow Pit Lake, and Reference Areas

Sauget Area I

Summation of Replicates	H' (Shannon-Weaver) Index (natural log)) <sup>a</sup>	Relative H' (H'/H'max) <sup>b</sup>	λ (Simpson's Index) <sup>c</sup>
F-1	2.28	0.82	0.14
F-2	1.66	0.69	0.25
F-3	1.60	0.56	0.31
BP-1	2.53	0.87	0.11
BP-2	2.09	0.74	0.23
BP-3	1.56	0.59	0.35
PDC-1	0.66	0.32	0.74
PDC-2	0.58	0.26	0.79
REF2-1	1.09	0.39	0.53
REF2-2	1.24	0.48	0.49

#### Notes:

- a: Shannon-Weaver is an index which measures species diversity. The higher the number, the greater the species diversity.
- b: Relative H' shows how close the sample is to maximum diversity, even distribution of organisms among the taxa is represented by "1".
- c: Simpson's is an index which measures the probability of two randomly selected organisms from a sample belonging to the same taxon. It is indirectly proportional to heterogeneity (the higher the value, the more homogeneous the sample.

Table 7-11 Community Composition of Six Major Taxonomic Groups Sauget Area I

Station	Taxa Group (6 Total)	Number of Organisms	Relative Abundance (%)
		_	
F-1	Chironomidae	74	47.44
F-1	Mollusca	34	21.79
F-1	Non-Chironomid Insects	26	16.67
F-1	Oligochaeta	22	14.10
F-2	Non-Chironomid Insects	96	62.34
F-2	Oligochaeta	44	28.57
F-2	Chironomidae	14	9.09
			<del>-</del>
F-3	Oligochaeta	286	81.25
F-3	Chironomidae	36	10.23
F-3	Non-Chironomid Insects	24	6.82
F-3	Mollusca	6	1.70
BP-1	Non-Chironomid Insects	56	44.44
BP-1	Oligochaeta	48	38.10
BP-1	Chironomidae	12	9.52
BP-1	Other*	10	7.94
BP-2	Oligochaeta	178	67.94
BP-2	Chironomidae	54	20.61
BP-2	Non-Chironomid Insects	30	11.45
	Oliver I	400	00.70
BP-3	Oligochaeta	122	80.79
BP-3	Non-Chironomid Insects	17	11.26
BP-3	Chironomidae	12	7.95
PDC-1	Oligochaeta	85	92.39
PDC-1	Non-Chironomid Insects	6	6.52
PDC-1	Chironomidae	1	1.09
	erii orierinade	<u>'</u>	1.00
PDC-2	Oligochaeta	138	93.24
PDC-2	Chironomidae	4	2.70
PDC-2	Non-Chironomid Insects	4	2.70
PDC-2	Crustacea	1	0.68
PDC-2	Mollusca	1	0.68
		· · · · · · · · · · · · · · · · · · ·	
REF2-1	Oligochaeta	3210	72.62
REF2-1	Non-Chironomid Insects	820	18.55
REF2-1	Chironomidae	320	7.24
REF2-1	Mollusca	50	1.13
REF2-1	Crustacea	20	0.45
REF2-2	Oligochaeta	62	71.26
REF2-2	Chironomidae	14	16.09
REF2-2	Non-Chironomid Insects	11	12.64

<sup>\*</sup>Hirudinea and Nematoda

# Table 7-12 Hilsenhoff's Biotic Index of Organic Stream Pollution Sauget Area I

	Hilsenhoff's Biotic Index
	(Expanded to Include
	Non-Arthropod
Summation of Replicates	Invertebrates)
BP-1	7.88
BP-2	8.86
BP-3	9.18
F-1	7.63
F-2	6.71
F-3	8.65
PDC-1	9.55
PDC-2	9.69
REF2-1	9.42
REF2-2	9.04
Value of Biotic Index	Degree of Impairment
0 - 3.5	None
3.51 - 4.5	Possible/Slight
4.51 - 5.5	Some
5.51 - 6.5	Fairly Significant
6.51 - 7.5	Significant
7.51 - 8.5	Very Significant
8.51 - 10.0	Severe

<sup>\*</sup>Adapted from Hilsenhoff, 1987.

# Table 7-13 Hyalella azteca Acute Toxicity Results Sauget Area I

### Results of 10 day Hyalella azteca Acute Toxicity Tests

Survival significantly lower than lab	control *P<0.	<u>05</u>							
[ ID	Survival (%)	Growth (mg)							
Lab Control	86	0.223							
None from Section F or Borrow	Pit Lake	_							
Growth Significantly lower than lab control P<0.05									
ID	Survival (%)	Growth (mg)							
Lab Control	86	0.202							
Borrow Pit 1	89	0.156							
Borrow Pit 1 Dup.	94	0.154							
Borrow Pit 3	91	0.154							
Survival and Growth NOT significan	itty lower than la	ab control							
ID	Survival (%)	Growth (mg)							
Lab Control	86	0.202							
Creek Section F-1	91	0.221							
Creek Section F-2	86	0.219							
Creek Section F-3	83	0.183							
Borrow Pit 2	96	0.172							
Lab Control	98	0.268							
PDC-1 (reference)	98	0.254							
PDC-2 (reference)	98	0.404							
Reference 2-1	98	0.393							
Reference 2-2	98	0.335							

Table 7-14

Hyallela azteca 42 Day Chronic Survival, Growth, And Reproduction Results

Sauget Area I

	ID	Day 28 Mean Survival (%)	Day 28 Mean Dry Weight (mg)	Day 35 Mean Survival (%)	Day 42 Mean Survival (%)	Day 42 Mean Dry Weight (mg)	Day 42 Mean Number of Neonates/Female
Lotic, creek habitat	PDC-1 (reference)	90	0.443	83	79	0.346	2.6
•	PDC-2 (reference)	89	0.648	85	80	0.498	6.2
	Creek Section F-1	91	0.639	89	84	0.397	4.8
	Creek Section F-2	90	0.554	74	70	0.447	3.8
	Creek Section F-3	89	0.661	85	76	0.406	4.8
	Ref-2-1 (creek portion)	70*		64	65	0.459	2.3
Lands and habited	Ref-2-2	87	0.458	85	83	0.351	3.4
Lentic, pond habitat	Rer-2-2 Borrow Pit 1	93	0. <b>458</b> 0.594	88	83	0.351	3. <del>4</del> 4.1
	Borrow Pit 1 Dup.	89	0.636	80	75	0.423	4.1
	Borrow Pit 2	82	0.563	74	73	0.390	4.3
	DOMOWINE		0.000	• •			7.0
	Borrow Pit 3	95	0.470	86	84	0.322	5.3
	Borrow Pit 3 No lentic samples of	95 exhibited statis	0.470 tically significant	86 reductions in	84 response com	0.322 pared to PDC-1	5.3 , PDC-2, or Ref-2-2.
Laboratory Controls							
Laboratory Controls	No lentic samples	exhibited statis	tically significant	reductions in	response com	pared to PDC-1	, PDC-2, or Ref-2-2.
Laboratory Controls	No lentic samples of	exhibited statis	tically significant	reductions in	response com 46	0.231	, PDC-2, or Ref-2-2.

Note: Reference area samples were used for comparison because survival in the laboratory control samples was low.

## Table 7-15 Acute Sediment Toxicity Testing Results with Chironomus tentans Sauget Area I

### Chironomus tentans Acute Toxicity Results (Day 10)

Survival significantly lower than	lab control F	P<0.05	
ID	Survival (%)	Growth (mg)	Interpretation
Lab Control	94	1.761	
Borrow Pit 1	64	2.643	
Borrow Pit 1 Dup.	40	4.071	
Borrow Pit 2	14	0.956	Acute toxicity
Borrow Pit 3	53	2.996	_
Creek Section F-1	31	2.686	Acute toxicity
Creek Section F-2	16	0.053*	Acute toxicity
Creek Section F-3	10	0.969	Acute toxicity
Lab Control	100	2.065	
PDC-1 (reference)	16	1.052*	Acute toxicity
PDC-2 (reference)	55	2.699	_
Reference 2-1	13	0.346*	Acute toxicity
Reference 2-2	11	1.409	Acute toxicity

<sup>\*</sup> Significant difference in growth.

Table 7-16

Results of Chironomus tentans Chronic Survival, Growth, Emergence, and Reproduction Toxicity Tests

Sauget Area I

	ID	Day 20 Mean Survival (%)	Day 20 Mean Ash Weight (mg)	Emergence Proportion (%)	Mean Eggs Hatched/ Female	Mean Days Survived, Female	Mean Days Survived, Male
Lab Control	12622	46	2.959	45	554	3.1	4.9
	Borrow Pit 1	0*		5*	0*	0*	0.7*
	Borrow Pit 1 Dup.	0*		8*	127*	0.3*	0.8*
	Borrow Pit 3	6*		14*	106*	0.8*	1,2*
Lab Control	12668	65	2.923	69	354	3.6	4.3
	PDC-2 (reference)	69	3.074	13*	249	1.1*	1.4*
		*Significantly of	different from corre	sponding laborat	ory control; P	<0.05	

Note: Samples exhibiting acute toxicity were not tested for chronic toxicity.

Table 7-17 Sediment Triad Evaluation Dead Creek Section F and Borrow Pit Lake Sauget Area I

	Dead	Dead Creek Section F			Borrow Pit Lake		Prairie du Po	nt Ref. Area 1	Long Slash Creek Ref Area 2	Ref Area 2	Average
Measure	SED-CSF-S1	SED-CSF-	32 SED-CSF-33	BPL-ESED-S1	BP-ESED-S-2	BPL-ESED-S3		SEU-KA1-SZ	SEU-RA2-S1	SED-RA2-S2	Reference Area
Chemistry											
Number of COPCs above TEC or LEL	\$10 3 (14 £23) S	بر الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد الأراد ا	4	6	10	7	3	1	1	3	2
Number of COPCs above PEC or SEL	4.	6	4	1	2 .	0	0	0	0	0	0
Benthic Community						<del> </del>		·-			
Number of Organisms	156	154	358	126	262	151	92	148	4420	87	109*
Number of Taxa	16	11	17	18	17	14	8	9	16	13	10°
TOC, %	4	14	6 1	6.7	4.5	3 3	1.2	2.3	1.3	2	1.7
Shannon Weaver Index	2.28	1.66	16	2.53	2.09	1 56	0.66	0.58	1 09	1.24	0.89
Relative H <sup>2</sup>	0.82	0 69	0.56	0.87	0.74	0.59	0.32	0.26	0.39	0 48	0 36
Simpsons Index <sup>3</sup>	0 14	0 25	0 31	0.11	0.23	0.35	0.74	0.79	0.53	0.49	0.64
Modified Hilsenhoff Biotic Index	7.88	8.86	9.18	7.63	6.71	8.65	9.55	9 69	9.42	9.04	9.43
Hilsenhoff Degree of Impairment	Very Significant	Severe	Severe	Very Significant	Significant	Severe	Severe	Severe	Severe	Severe	Severe
Sediment Toxicity <sup>2</sup>					<u>-</u>						
Amphipod Acute Survival	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NA
Amphipod Acute Growth Effects	NE	NE	NE	X	NE	X	NE	NE	NE	NE	NA
Amphipod Chronic Survival	NE	NE	NE.	NE	NE	NE	NE	NE	NE	NE	NA
Amphipod Chronic Growth Effects	NE	NE	NE	NE	NÉ	NE	NE	NE	NE	NE	NA
Amphipod Chronic Reproduction Effects	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NA
Chironomid Acute Survival	X	X	X	X	X	X	X	X	×	X	NA
Chironomid Acute Growth Effects	NE	×	NE	NE	NE	NE	X	NE	×	NE	NA
Chironomid Chronic Survival	NT	NT	NT	X		X	NT	NE	NT	NT	NA
Chironomid Chronic Growth Effects	NT	NT	NT	NT	NT	NT	NT	NE	NT	NT	NA
Chironomid Chronic Effects on Emergence		NT	NT	X	NT	X	NT	X	NT	NT	NA
Chironomid Chronic Reproductive Effects	NT	NT	NT	X	NT	X	NT	X	NT _	NT	NA

<sup>&</sup>lt;sup>1</sup> The Shannon-Weaver index is a measure of species diversity; the higher the index, the more diverse the sample.

Shading indicates a possible measurement of effect relative to the reference areas

Relative H' is a measure of the eveness of distribution of organisms among taxa. The most even distribution is theoretically has a H' value of 1.

<sup>&</sup>lt;sup>3</sup>Simpson's Index is indirectly related to sample heterogeneity; the lower the value, the more heterogeneous the sample.

<sup>&</sup>lt;sup>4</sup>X indicates an effect was measured in that sample. NT indicates the sample was not tested for that effect. Samples for which acute toxicity was high were not carried through chronic toxicity testing. NA = not applicable

NE = no statistically significant effect measured in sample.

<sup>\*</sup> indicates that sample SED-RA2-S1 was not included in average

Table -18
List of Fish and Wildlife Species Observed On and Near Dead Creek and the Borrow Pit Lake
Sauget Area I

	i	Dead (	reek Floo	dplain	Dead Creek and Borrow Pit Lake			
	!	Wet/				Dead & Prairie		'. <del></del>
		Upland	Wet/Dry	Riparian	Terrestrial	du Pont	Borrow Pit	Aquatic Mississippi
Common Name	Scientific Name	Shrubs	Field	Woods	Wetland System <sup>1</sup>	Creeks	Lake	System <sup>1</sup> River
	1	•						
AMPHIBIANS		4.2		!				
Northana anistrat fran	Acris crepitans					:		
Northern cricket frog	• •	1	:	:	0		!	
Bullfrog	Rana catesbeiana			:	,i. O	1 2		
American Toad	Bufo americanus	0	<b>X</b>	, X	i	. <b>X</b>	<b>X</b>	
Gray Treefrog	Hyla versicolor	X		0		X	X	
Pickerel Frog	Rana palustris	X	0	X	1	X	X	
		i i						
REPTILES		:			:			
REFILES		•		!	1	:		
Red-eared Slider	Pseudemys scripta					0		X
Painted Turtle	Chrysemys picta	} -	•			o ·	0	
·	,,-	,	:					· · · · · · · · · · · · · · · · · · ·
-								to the state of the
	•	1	•		i			
BIRDS				1	1		ere en en en en en en en en en en en en en	
		i	į.		T			
Yellow-rumped warbler	Dendroica coronata	i .	į		0		. ·	
White-crowned sparrow	Zonotrichia leucophrys	•		!	0			
White-throated sparrow	Zonotrichia albicolis	*		–	0			
Vesper sparrow	Pooecetes gramineus		T.	1	0		:	, ,
Swamp sparrow	Melospiza geogiana	1			0			
Red-billed gull	Larus delawarensis						·	0
Red-bellied woodpecker	Melanerpes carolinus	:			0		1	
Orange-crowned warbler	Vermivora celata				0			
Norhern flicker	Colaptes auratus				0		. :	
Nashville warbler	Vermivora ruficapilla			:	0			
House finch	Carpodacus mexicanus	1	1	:	0			
Hooded merganser	Lophodytes cucullatus				0			0
Herring gull	Larus argentatus	1		· i	.1			0
Great horned owl	Bubo virginianus			1	0		!	
Golden-crowned kinglet	Regulus satrapa	•		!	0			
Gadwall	Anas		•		0			0
Fox sparrow	Passerella ilica		1		0			
Field sparrow	Spizella pusilla		1	•	0			
Eurasian tree sparrow	Passer montanus			i	О			

Table 7-18
List of Fish and Wildlife Species Observed On and Near Dead Creek and the Borrow Pit Lake
Sauget Area 1

	<del></del>		Dead (	Creek Floo	dplain	Dead Creek and Borrow Pit Lake				
		WeV			•	Dead & Prairie				
		Upland	WeUDry	Riparian	Terrestrial	du Pont	<b>Borrow Pit</b>	Aquatic	Mississippi	
Common Name	Scientific Name	Shrubs	Field	Woods	Wetland System <sup>1</sup>	Creeks	Lake	System <sup>1</sup>	River	
Eastern towhee	Pipilo erythrophthalmus				o					
Eastern meadowlark	Sturnella magna				0					
Eastern bluebird	Sialia siaks									
Dark-eyed Junco	Junco hyemalis				0					
Canada Goose	Branta canadensia				0			O		
Black-capped Chickadee	Poecile atricapillus				0					
Brown Thrasher	Toxontoma ruhim				O					
American Black Duck	Arias rubitpos				O			O		
American Coot	l ulica americana							O		
Great Blue Heron	Ardea herodias		×	0	0	O	x	O	O	
Great Egret	Casmerodius albus		0			O	O		O	
Snowy Egrat	Egretta caerulea					O	O		О	
Little Blue Heron	Egretta thula					0	Ω		O	
Cattle Egret	Rubulcus ibis		O							
Green-backed Heron	Butorides striatus	0		×		0	0		0	
Black-crowned Night-Heron	Nyatiaorex nyatiaorex			×	0	0	×	O	O	
Wood Duck	Aix spon <b>ss</b>	×		×	O	0	X	O	×	
Mallard	Anns platythynchos	×	×	×	O	O	x	O	×	
Turkey Vullure	Colliartes aura	×	0	X			x			
Brild Engle <sup>7</sup>	Halineetus leucocephalus					×			×	
Red-tailed Hawk	Buleo jamaicensis	×	O	0	O					
American Kestrel	Falco sparverius	0	0		O					
Northern Bobwhite	Colinus virginianus	O	×		O					
Killdeer	Charadrius vociferus		0		O					
Rock Dove	Columba livia		×		0					
Mourning Dove	Zenalda macroura	0	0	0	0					
Yellow-billed Cuckoo	Coccyzus americanus	0		0						
Chimney Swift	Chaeture pelagica	0	×	×		0	0		×	
Belted Kingfisher	Ceryle alcyon				0	0	0	0	0	
Red-headed Woodpecker	Melanerpes erythrocephalus			0						
Downy Woodpacker	Picoides pubescens	0		0	0					
Eastern Phoebe	Sayornia phoebe	X		0	0	0	×		×	
Eastern Kingbird	Tyrannus tyrannus	0	0			×	×		×	
Tree Swallow	Tachycineta bicolor	X	0	X	0	0	×		×	
Bank Swallow	Riparia riparia	x	0	×		×	×		×	
Cliff Swallow	Hirundo pyrrhonota	×	0	X		X	x		×	
Barn Swallow	Hirundo rustica	×	0	x		0	0		×	

### Table 7-18 List of Fish and Wildlife Species Observed On and Near Dead Creek and the Borrow Pit Lake Sauget Area I

	į		Dead (	Creek Floo	dplain	Dead	Pit Lake		
		Wet/		1		Dead & Prairie			
	!	Upland	Wet/Dry	Riparian	Terrestrial	du Pont	Borrow Pit	Aquatic	Misslssipp
Common Name	Scientific Name	Shrubs	Field	Woods	Wetland System <sup>1</sup>	Creeks	Lake	System <sup>1</sup>	River
Blue Jay	Cyanocitta cristata	×	; !	0	O		1		!
American Crow	Corvus brachyrhynchos	×	. 0	. 0	0		•		
Carolina Chickadee	Parus carolinensis	×	;	: О	0				I.
Tufted Titmouse	Parus bicolor			0	0				4
White-breasted Nuthatch	Sitta carolinensis	•		0	0				
Brown Creeper	Certhia americana	1		Ο	o o		i		
Carolina Wren	Thryothorus Iudovicianus	0		x	0				
House Wren	Troglodytes aedon	. 0		0					
American Robin	Turdus migratorius	О	. 0	0	0		1		1
Gray Catbird	Dumetella carolinensis	0	i	0	0				
Nothern Mockingbird	Mimus polyglottos	×	. <b>x</b>		0	•		•	
Cedar Waxwing	Bombycilla cedrorum	0		0	0		•		1.1.1
European Starling	Sturnus vulgaris	. <b>X</b>	0	0	0		•		
Common Yellowthroat	Geothylpis trichas	0		×		•			
Northern Cardinal	Cardinalis cardinalis	0	:	о о	0	9	•	1	
Indigo Bunting	Passerina cyanea	. 0	:	0			•	• • •	*
Song Sparrow	Melospiza melodia	0	. 0	x	0		1	•	
Red-winged Blackbird	Agelaius phoeniceus	0	. 0	0	0	0	 O	•	
Common Grackle	Quiscalus quiscula	. 0	x	0	0				
Northern Oriole	icterus galbula		1.	. 0		•		•	
American Goldfinch	Carduelis tristis	0	. 0	. 0	· O			•	
House Sparrow	Passer domesticus		x	•	0		:		
					:				
-		1							
MAMMALS		1				•	•	•	-
iiiAiiiiAE0		•							•
Eastern gray squirrel	Sciurus carolinensis				0			•	•
Eastern cottontail	Sylvilagus floridanus				0				
Eastern chipmunk	Tamias striatus				0	•	•	:	
Common muskrat	Ondatra zibethicus				. 0				
Gray Squirrel	Sciurus carolinensis	0		0					
Fox Squirrel	Sciurus niger			. 0					
Beaver	Castor canadensis	1		0	0	0	0		0
Raccoon	Procyon lotor	o	X	. 0	••	0	0		Ö
White-tailed Deer	Odocoileus virginianus	0	0	0		0			
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	• •		•						

Table 7-18
List of Fish and Wildlife Species Observed On and Near Dead Creek and the Borrow Pit Lake
Sauget Area I

			Dead (	Creek Floo	dplain	Dead Co			
		WeU				Dead & Prairie			
		Upland	WeVDry	Riparian	Terrestrial	du Pont	Borrow Pit	Aquatic	Mississippi
Common Name	Scientific Name	Shrube	Field	Woods	Wetland System'	Creeks	Lake	System <sup>1</sup>	River
FISH•									
Blackstripe topminnow	Fundulus notatus							0	
Bowfin	Anva calva					SO	0		
Gizzard Shad	Dorosoma capadianum					SO			
Grass Pickeral	f sox americanus					SO			
Common Stoneroller	Campostoma anomalum					SO			
Goldfinh	Carassius aurstus					SO			
Carp	Сургіния свірю					so	O		
Golden Shiner	Notemigonus crysoleucas					SO			
Bigmouth Shiner	Notropia doraalia					SO			
Red Shiner	Notropia lutranaia					so			
Sand Shiner	Notropia atraminava					so			
Fathead Minnow	Pimophalos prometas					so			
Creek Chub	Semotilus atromaculatus					so			
White Sucker	Catastomus commersoni					so			
Bigmouth Buffalo	letiobus cyprinellus					so			
Black Bullhead	ictalurus meias					SO		0	
Yallow Bullhead	ictalurus natalis					so			
Channel Catfish	Ictalurus punctatus					O & SO			
Mosquitofish	Gambusia affinis					so			
Green Sunfish	l epomia cyanellus					so			
Warmouth	l epomis gulosus					so			
Orangespotted Sunfish	Lepomis humilis					so			
Bluegill	Lepomis macrochirus					SO	O		
Largemouth Bass	Micropterus salmoides					so	O		
Black Crappie	Pomoxia nigromaculatus					SO	0		
Freshwater Drum	Aplodinotus grunniens					SO	O		
White Bass	Morone chrysops						0		
Crappie	Ротоків врр						0		
White Crappie	Pomoxia annularia						0		
Brown Bullhead	Amelurus nebulosus						0		
Black Bullhead	Ameiurus melas						0		
Gar	Lepisosteus app.						0		
Spotted Gar	Lepisoateus oculatus						0		
Johnny Darter	Etheostoma nigrum						0		

### Table 1-18 List of Fish and Wildlife Species Observed On and Near Dead Creek and the Borrow Pit Lake Sauget Area I

	I		Dead (	Creek Floor	dplain	Dea	d Cre	ek and Borro	w Pit La	ake	ı
		Wet/		I.		Dead & Prairie			į		
•		Upland	Wet/Dry	Riparlan	Terrestrial	du Pont		Borrow Pit	,	Aquatic	Mississippi
Common Name	Scientific Name	Shrubs	Field	Woods	Wetland System <sup>1</sup>	Creeks	i	Lake	;	System <sup>1</sup>	River
Silver Carp	Hypophthalmichthys molitrix	•						O			. (
Quillback	Carpiodes cyprinus				:			0			
Moon eye	Hiodon tergisus				1			- ·	:		1
Gold eye	Hiodon alosoides			1				0			
Walleye	Stizostedion vitreum	1					1.	0			
Small unidentified fish					: !	0		0			0
	X - Species Probably Utilize	es Habitat		O - Species C	· Observed in the Habitat	•	!				i
	SO - Species Observed in t		ainage during								
					···,						
* From Atwood, E.R., 1992.	Assessment of Fisheries Quality	of Streams in the An	nerican Botton	<u>ns Basin,</u> IL De	pt. of Conservation, 48	pp.					
Except where noted, observa	tions were made during wildlife s	survey in 1996.									
Observations made in Nover	mber 2000.								-		
2							1				
				· · · ·	,						

Table 7-19
Plant Concentrations in Dead Creek Section F and both Reference Areas
Sauget Area I

	Site	1	Reference	Reference
Commonand	Maximum	Site Average		
Compound Herbicides (ug/kg)	maximum)	OILE AVERAGE	Maximum	Average
2,4-D		ND	NO	ND .
	ND		ND	
2,4-08	ND	ND 110	ND	ND 50
Dicamba	ND	ND	1.8	5.9
Dichloroprop	7	28.5	ND	ND
MCPA	ND	ND	ND	ND
MCPP	ND	ND	1300	1150
Pentachlorophenol	ND	ND	2	6
Metals (mg/kg)				
Aluminum, Total	44	37	360	260
Antimony	0.13	0.115	ND	ND
Arsenic, Total	0.56	0.49	1.1	0.78
Barium, Total	ND	ND	ND	NID
Cadmium, Total	0.097	0.1735	ND	ND
Chromium, Total	ND	ND	0.53	0.39
Copper, Total	2.1	2	1.3	1.13
Iron	ND	ND	ND	ND
Leed. Total	1.2	0.82	0.64	0.47
Manganese	ND	ND	ND	ND
Mercury	ND I	ND	ND	ND
Molybdenum	ND	ND I	ND	ND
Nickel, Total	2.6	1.9	ND	ND ND
Selenium	ND ND	ND I	ND	ND ND
Silver	ND	ND	ND ND	NO NO
Zinc, Total	26	23	8.3	7.55
Total PCBs (ug/kg)	ND ND	ND ND	ND	ND ND
	NU	NU	שא	
Pesticides (ug/kg)				
4,4'-000	ND	ND	ND	ND S
4,4'-DDE	ND	ND	ND	ND
4,4'-00T	ND	ND	ND	ND
Aldrin	0.81	3.905	1_	4
Alpha Chlordane	ND	ND	ND	ND
delta-BHC	NO	ND	ND	ND
Dieldrin	ND	ND	ND	ND
Endosulfan I	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND
Endosulfan sulfate	NO	ND	ND	ND
Endrin aldehyde	NO	ND	ND	ND
Endrin ketone	NO	ND	NED	ND
Gamma Chlordane	3.1	5.05	ND	ND
gamma-BHC (Lindane)	NO	ND	ND	ND
Heptachior	1.9	1.85	3.8	5.4
Heptachlor epoxide	NO	ND	ND	ND
Methoxychlor	NO	ND	ND	ND
SVOC (ug/kg)				
bis(2-ethylhexyl)phthalate	ND	ND	ND	ND
Di-n-butylphthalate	ND ND	ND	ND	ND I
Diethylphthalate	ND ND	ND	ND	ND I
Acenephthylene	32	58.5	ND	ND
Acompriumyrene Puoranthene	ND ND			ND ND
	- 1	ND	ND	- 1
Benzo(b)fluoranthene	59	72 50 5	16 ~	51
Benzo(k)fluoranthene	52	68.5	21	53
Benzo(a)pyrene	140	113	37	26
Benzo(g.h.i)perylene	360	223	390	315
indeno(1,2,3-c-d)pyrene	300	192.5	440	330
Dibenz(a,h)anthracene	76	80.5	400	290
2,3,7,8-TCDD TEQ Mammal	0.000202	0.00017	8.46E-05	5.75E-05
2,3,7,8-TCDD TEQ Bird	9.73E-05	8.48E-05	2.97E-05	2.06E-05

#### Table 7-20a Results of Food Chain Modeling Sauget Area I Creek Sector F

	<b>T</b>	SCENARIO <sup>1</sup>									
	Mallard	Duck-	Mallard		Mallard D	uck-Creek	Mallard D	uckCreek			
1	Creek Sec		,	Sector F		F Plant		F Plant			
	Ingestion-	- Average	Plant Ing	gestion	Ingestion	Average	Inges	stion			
1	shallow s	ediment	Maximun	n shallow	combine	d shallow	Maximum combine				
			sedi	nent	and deep	sediment	shallow	and deep			
]	<u>L</u>		l				sedi	ment			
		I	T			T					
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL			
Compound	Hazard Index	Hazard Index	Hazard Index	Hazard Index	Hazard Index	Hazard Index	Hazard Index	Hazard Index			
2,4-D	NB	NB	NB	NB	NB	NB	NB	NB			
2.4-DB	0.E+00	NB	0.E+00	NB	0.E+00	NB	0.E+00	NB			
Dicamba	NB	NB	NB	NB	NB	NB	NB	NB			
Dichloroprop	NB	NB	NB	NB	NB	NB	NB	NB			
МСРА	NB	NB	NB	NB	NB	NB	NB	NB			
МСРР	NB	NB	NB	NB	NB	NB	NB	NB			
Pentachlorophenol	NB	NB	NB	NB	NB	NB	NB	NB			
Aluminum, Total	1.E-04	NB	4.E-01	NB	1.E-04	NB	4.E-01	NB			
Antimony	NB	NB	NB	NB	NB	NB	NB	NB			
Arsenic, Total	2.E-05	7.E-06	4.E-02	2.E-02	2.E-05	7.E-06	4.E-02	2.E-02			
Barium, Total	9.E-06	4.E-06	2.E-02	1.E-02	9.E-06	4.E-06	2.E-02	1.E-02			
Beryllium, Total	NB	NB	NB	NB	NB	NB	NB	NB			
Cadmium, Total	2.E-05	2.E-06	7.E-02	5.E-03	2.E-05	2.E-06	7.E-02	5.E-03			
Chromium, Total	2.E-05	5.E-06	6.E-02	1.E-02	2.E-05	5.E-06	6.E-02	1.E-02			
Copper, Total	1.E-05	8.E-06	3.E-02	2.E-02	3.E-05	2.E-05	2.E-01	2.E-01			
Iron Lead, Total	NB 2.E-04	NB 2.E-05	NB 8.E-01	NB	NB 2 E 04	NB 2.E-05	NB 8.E-01	NB 8.E-02			
Manganese	3.E-04	NB	8.E-04	8.E-02 NB	2.E-04 3.E-07	NB	8.E-01	NB			
Mercury	8.E-05	8.E-06	3.E-01	3.E-02	8.E-05	8.E-06	3.E-04 3.E-01	3.E-02			
Molybdenum	4.E-07	4.E-08	2.E-03	2.E-04	4.E-07	4.E-08	2.E-03	2.E-04			
Nickel, Total	6.E-06	4.E-06	2.E-02	1.E-02	6.E-06	4.E-06	2.E-02	1.E-02			
Selenium	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00			
Silver	NB	NB	NB	NB	NB	NB	NB	NB			
Vanadium, Total	3.00E-06	NB	7.00E-03	NB	3E-06	NB	7E-03	NB			
Zinc, Total	4.E-04	4.E-05	9.E-01	1.E-01	5.E-04	6.E-05	2.E+00	2.E-01			
Total PCBs	3.E-07	3.E-08	1.E-03	1.E-04	4.E-06	4.E-07	6.E-02	6.E-03			
Total DDT	9.E-06	9.E-07	2.E-02	2.E-03	9.E-06	9.0.E-07	2.E-02	2.E-03			
Aldrin	NB	NB	NB	NB	NB	NB	NB	NB			
Alpha Chlordane	1.E-09	3.E-10	4.E-06	8.E-07	1.E-09	3.E-10	4.E-06	8.E-07			
delta-BHC	5.E-10	1.E-10	1.E-06	2.E-07	5.E-10	1.E-10	1.E-06	2.E-07			
Dieldrin Endoculfon I	1.E-07	NB	2.E-04	NB	1.E-07	NB	2.E-04	NB			
Endosulfan I Endosulfan II	2.E-10 4.E-10	NB	9.E-07	NB	2.E-10 4.E-10	NB NB	9.E-07	NB NB			
Endosulfan sulfate	4.E-10 2.E-10	NB NB	1.E-06 4.E-07	NB NB	4.E-10 2.E-10	NB NB	1.E-06 4.E-07	NB NB			
Endrin aldehyde	7.E-07	7.E-08	4.E-07 2.E-03	2.E-04	7.E-07	7.E-08	4.E-07 2.E-03	2.E-04			
Endrin ketone	6.E-07	6.E-08	2.E-03	2.E-04	6.E-07	6.E-08	2.E-03	2.E-04			
Gamma Chlordane	2.E-07	4.E-08	4.E-04	9.E-05	2.E-07	4.E-08	4.E-04	9.E-05			
gamma-BHC (Lindane)	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00			
Heptachlor	NB	NB	NB	NB	NB	NB	NB	NB			
Heptachlor epoxide	NB	NB	NB	NB	NB	NB	NB	NB			
Methoxychlor	NB	NB	NB	NB	NB	NB	NB	NB			
Total PAHs	2.E-06	2.E-07	8.00E-03	8.E-04	2.E-06	2.E-07	8.E-03	8.E-04			
bis(2-ethylhexyl)phthalate	0.E+00	NB	0.E+00	NB	0.E+00	NB	0.E+00	NB			
Di-n-butylphthalate	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0	0			
Diethylphthalate	NB	NB	NB	NB	NB	NB	NB	NB			
Acenaphthylene		[ ]	•		- :		*	: I			
Fluoranthene		: [	•			. 1		: 1			
Benzo(b)fluoranthene		. i				.		. i			
Benzo(k)fluoranthene		.		1	•	.	•	.			
Benzo(a)pyrene Benzo(a h i)perviene		.									
Benzo(g,h,i)perylene Indeno(1,2,3-c-d)pyrene		.						.			
Dibenz(a,h)anthracene	. [	. [	•	. [			. !	.			
Dioxin - TEQ	1.E-05	1.E-06	3.E-02	3.E-03	1.E-05	1.E-06	3.E-02	3.E-03			
			V V_	V 00				00			

<sup>&</sup>lt;sup>1</sup>In this scenario, the mallard is assumed to ingest plants, sediment, and surface water.

#### Table 7-20a Results of Food Chain Modeling Sauget Area I Creek Sector F

Tree Seation		<u> </u>	SCENARIO <sup>2</sup>									
Creek Sector F   Insect Presents   Insect Pres		Tree S	waton-	Tree S	wallow			Great Ba	e Heron-	Bald Eac	te-Creek	
Average station   Sectio										Sector F Fish		
MOAE    LOAE    MOAE    MOAE    MOAE    LOAE    MOAE		Insect is	ngeston-	insect in	ngestion-	ingestion	Based on	Ingestion	based on	Ingestion	-based on	
NOAEL   LOAEL   LOAEL   LOAE				, -		4	_	1	_		_	
NOAEL   LOAEL   LOAEL   LOAE		sed	iment	1		shallow	sediment	shallow	sediment	shallow	sediment	
	Ĭ	<u> </u>		560	ment							
					l							
	1			1		1						
2.4-OB	k											
Deciniparioproper   M8							_	_	_	_		
MGCPP			_	1	_	_						
Mail	Dichloroprop	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	
Personation content   N.B.		N6	NB.		NB		_		_	_		
Automotion, Total	I -	_	_								_	
Artsmoory	-		_	_	1 -			_			-	
Semular   Total   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-03   5E-04   1E-04   5E-05   5E-03   1E-03   6E-06   1E		_			_						_	
Barum, Total	, , ,			_						_		
Cadmisum, Total   Called   AE-01   AE-00   AE-01   2E-04   5E-05   5E-03   1E-03   6E-06   6E-06   Chromisum, Total   Called   AE-01   ZE-00   AE-01   ZE-00   SE-05   5E-03   TE-03		1			1	, ,						
Chrommum. Total			,									
Copper   Total   SE-01   SE-01   SE-01   SE-04   SE-04   NB   NB   NB   NB   NB   NB   NB   N	Cadmium, Total										0.E+00	
Read, Total												
Lead, Total				_				. –	_	_		
Marcury			_	_		_			_			
Mercury   2,E+00		_	_		:							
Motolycolerum			_				- 1		_			
Selentum	/	_										
Shight   NB	Nichel Total	6 E-02	5 E-02	6 E-02	5.E-02	2 E-05	2.E-05	4.E-07	3.E-07	5.E-10	4.E-10	
Variadium, Total         4 E-05         NB         4 E-05         NB         3 E-06         NB         5 E-07         NB         8 E-10         NB           Zinc, Total         4 E-05         NB         4 E-06         5 E-01         2 E-02         2 E-02         2 E-02         2 E-02         2 E-04         3 E-05           Total POEs         1 E+01         1 E+01         1 E+01         1 E+01         1 E+01         1 E+01         3 E-03         3 E-03         3 E-04         4 E-04         4 E-05         4 E-07         3 E-01         3 E-03         3 E-04         4 E-06         4 E-07         3 E-01         3 E-03         3 E-03         3 E-04         4 E-06         4 E-07         4 E-06         4 E-07         3 E-01         3 E-00         3 E-01         3 E-00         3 E-00         3 E-00         3 E-00         0 E+00         "><th></th><th></th><th>_</th><th></th><th>. –</th><th></th><th></th><th>_</th><th></th><th></th><th></th></t<>			_		. –			_				
Zmc, Total   4.E+00			_	_		_		_		_		
Total PCBs					-		-				_	
Total DDT			-									
Aldrin         NB         0.E+00         NB         0.E+00         0.E+00         0.E+00         0.E+00         0.E+00         0.E+00         0.E+00							_					
Deficial color   Defi	Aldrin	NB	NB	NB	NB	NB	NB	NB.	NB	NB		
Design											0.E+00	
Endosulfan I 0 E+00 NB 0 E+00 NB 2 E-10 NB 0 E+00 NB NB NB NB NB NB NB NB NB NB NB NB NB		_	_			_						
Endosulfan II							_		_		_	
Endosulfan sulfate 5 E-04 NB 7 E-04 NB 2 E-10 NB 0 E+00 NB 0 E+00			_		_		- 1	_				
Endrin aldehyde			-		_							
Serior   S		-			_							
GE   GE   GE   GE   GE   GE   GE   GE	Endran ketone	2 E-01	2.E-02	3 E-01	3 E-02	6 E-07	6 E-08	0.E+00	0.E+00	0.E+00	0.E+00	
Heptachtor   NB   NB   NB   NB   NB   NB   NB   N							I					
Heptacritor eposide	- ·				_	1	/					
Mainoxychtor		_	_	_			- 1		- 1			
Total PAHs 6 E-03 6 E-04 7 E-03 7 E-04 5 E-08 5 E-09 4 E-08 4 E-09 5 E-11 5 E-12 bis(2-ethythexyl)phthatete 0 E+00 NB 0 E+00 NB NE NB NB NB NB NB NB NB NB NB NB NB NB NB		_	_			- 1		_		-		
District   District	T		_		35.4.			4 5 44	4 5 00			
Distription state NS NS NS NS NS NS NS NS NS NS NS NS NS	bis(2-ethylhexyl)phthalate	0 E+00								_		
Acenaphthylene Fluoranthene Bertzo(b)fluoranthene Bertzo(a)pyrene Bertzo(a)pyrene Bertzo(a)pyrene Indeno(1,2,3-c-d)pyrene Olbertz(a,h)anthracene	Di-n-bury/phthalate	0 E+00	0 E+00	0 E+00	0 E+00	NÉ	NE	NE	NE	NE	NE	
Fluoranthene Benzo(b)fluoranthene Benzo(a)fluoranthene Benzo(a)Li)penytene Indeno(1,2,3-c-d)pyrene Olberz(a,b)anthracene	Chathylphthalate	NB	NB	NB	NB	NB .	NB	NB	NB	NB	NB	
Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(g,hu)perytene Indeno(1,2,3-c-d)pyrene Oibenz(a,h)anthracene	Acenaphthylene	•	•	•	•	:	•	:	<u> </u>	•	•	
Benzo(k)fluoranthene Benzo(a)pyrene Benzo(a,hu)perytene Indeno(1,2,3-c-d)pyrene Oberzo(a,h)perthracene		•		•	•		.		:			
Benzo(a)pyrene Benzo(g,hu)perylene Indeno(1,2,3-c-d)pyrene Dibenz(a,h)anthracene		•		•	•		.			. !		
Benzo(g.h./)perylene Indeno(1.2,3-c-d)pyrene Ciberz(a,h)anthracene Indeno(1.2,3-c-d)pyrene Indeno(1.2,			•	•	•		.	• [	• [	•	.	
Indeno(1,2,3-c-d)pyrene Diberz(a,h)anthracene	_	•	•	•	•	•	•		•	•	•	
Olbers(a,h)enthracene	Indeno(1,2,3-c-d)pyrene	•	•	•	•	.	•	•	•	•	•	
Diction - TEQ 4.6-60 4.6-60 4.6-60 6.6-01 6.6-05 6.6-06 1.6-02 1.6-03 1.6-05 1.6-06 1.6-06	Olbertz(a,h)anthracene	•	•	•	•	•	•	-	•	•	•	
	Diction - TEQ	4.E+00	4 E-01	6.E+00	6 E-01	6 E-05	6 E-06	1.E-02	1.E-03	1.E-05	1.E-06	

<sup>2</sup>The biota concentrations in these scenarios was modeled using site-specific BAFs. The maltard was assumed to ingest snails, sediment, and surface water. The great blue heron was assumed to ingest fish and surface water. The eagle was assumed to ingest fish and surface water. The tree swallow was assumed to ingest insects and surface water. In addition to site-specific BAFs, the insect concentrations for the tree swallow scenario were modeled using literature BSAFs and literature regression equations (for some metals and PCBs).

#### Table 7-20a Results of Food Chain Modeling Sauget Area I Creek Sector F

							ARIO <sup>3</sup>					
	1	Muskrat		Muskrat-		Muskrat-	Female	Muskrat		Muskrat-	River OtterDead	
[		ctor F Plant	1	ctor F Plant		tor F Plant		tor F Plant		ctor F Snail		ctor F Fish
	1 -	Average		–Maximum		Average		-Maximum		-based on		-based on
	shallow	sediment	shallow	sediment		d shallow	1	d shallow		l average		average
					and deep	sediment	and deep	sediment	sedi	ment	shallow	sediment
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard
Compound	Index	Index	Index	Index	Index	Index	Index	Index	Index	Index	Index	Index
2,4-D	6.E-05	1.E-05	6.E-05	1.E-05	6.E-05	1.E-05	6.E-05	1.E-05	6.E-05	1.E-05	1.E-08	3.E-09
2,4-DB	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE	NE I	NE	NE
Dicamba	0.E+00	0.E+00	0.E+00	0.E+00 NB	0.E+00	0.E+00	0.E+00	0.E+00 NB	NE	NE	NE	NE NE
Dichloroprop	0.E+00	NB 0 E+00	NB 0,E+00	0.E+00	NB	NB	NB		NB	NB I	NB	NB
MCPA MCPP	0.E+00	0.E+00 0.E+00		0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE	NE	NE	NE
3	0.E+00	0.E+00	0.E+00 0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE	NE	NE	NE
Pentachlorophenol	5.E+01	5.E+00		7.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE 2 E+02	NE NE	NE 1 E OO	NE
Aluminum, Total Antimony	9.E-01	9.E-02	7,E+01 1,E+00	1.E-01	<b>5.E+01</b> 9.E-01	5.E+00 9.E-02	7.E+01 1.E+00	7.E+00 1.E-01	3.E+02 2.E+00	3.E+01 2.E-01	1.E-02 3.E-05	1.E-03 3.E-06
Arsenic, Total	1.E-01	9.E-02 NB	1.E-01	1.E-01 NB	9.E-01 1.E-01	9.E-02 NB	1.E+00 1.E-01	NB	4.E-01	2.E-01	3.E-05 4.E-06	3.E-06 NB
Barium, Total	5.E-02	4.E-02	6.E-01	4.E-02	5.E-02	4.E-02	6.E-02	4.E-02	5.E-02	4.E-02	4.E-06 1.E-05	8.E-06
Bervilium, Total	2.E-03	2.E-04	3.E-02	2.E-04	2.E-03	2.E-04	3.E-02	2.E-04	2.E-02	4.E-02 2.E-04	6.E-07	5.E-08
Cadmium, Total	1.E-01	1.E-02	3.E-03 2.E-01	2.E-02	1.E-01	1.E-02	3.E-03 2.E-01	2.E-04 2.E-02	6.E-01	6.E-02	1.E-05	1.E-06
Chromium, Total	3.E-05	NB	4.E-05	NB NB	3.E-05	NB	4.E-05	NB	3.E-04	NB	4.E-08	NB
Copper, Total	1.E-01	9.E-02	1.E-01	1.E-01	3.E-03	2.E-01	1.E+00	8.E-01	2.E+00	2.E+00	7.E-05	5.E-05
Iron	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
Lead, Total	1.E-01	1.E-02	2.E-01	2.E-02	1.E-01	1.E-02	2.E-01	2.E-02	7.E-01	7.E-02	4.E-05	4.E-06
Manganese	1.E-02	3.E-03	2.E-02	6.E-03	1.E-02	3.E-03	2.E-02	6.E-03	1.E-02	3.E-03	2.E-06	7.E-07
Mercury	5.E-02	1.E-02	1.E-01	2.E-02	5.E-02	1.E-02	1.E-01	2.E-02	5.E-02	1.E-02	5.E-03	9.E-04
Molybdenum	6.E-02	6.E-03	1.E-01	1.E-02	6.E-02	6.E-03	1.E-01	1.E-02	6.E-02	6.E-03	1.E-05	1.E-06
Nickel, Total	4.E-02	2.E-02	6.E-02	3.E-02	4.E-02	2.E-02	6.E-02	3.E-02	1.E-01	7.E-02	3.E-06	2.E-06
Selenium	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE	NE NE	NE	NE NE
Silver	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE '	NE	NE	NE
Vanadium, Total	5.E-01	5.E-02	7.E-01	7.E-02	5.E-01	5.E-02	7.E-01	7.E-02	5.E-01	5.E-02	1.E-04	1.E-05
Zinc, Total	1.E-01	5.E-02	1.E-01	7.E-02	2.E-01	8.E-02	3.E-01	1.E-01	4.E-01	2.E-01	4.E-04	2.E-04
Total PCBs	1.E-03	6.E-04	2.E-03	9.E-04	1.E-02	7.E-03	1.E-01	5.E-02	2.E-02	1.E-02	6.E-05	3.E-05
Total DDT	1.E-04	2.E-05	1.E-04	3.E-05	1.E-04	2.E-05	1.E-04	3.E-05	1.E-04	2.E-05	2.E-05	3.E-06
Aldrin	2.E-03	4.E-04	2.E-03	4.E-04	2.E-03	4.E-04	2.E-03	4.E-04	6.E-05	1.E-05	1.E-08	3.E-09
Alpha Chlordane	4.E-06	2.E-06	6.E-06	3.E-06	4.E-06	2.E-06	6.E-06	3.E-06	4.E-06	2.E-06	9.E-10	5.E-10
delta-BHC	5.E-05	5.E-06	5.E-05	5.E-06	5.E-05	5.E-06	5.E-05	5.E-06	5.E-05	5.E-06	1.E-08	1.E-09
Dieldrin	1.E-03	1.E-04	1.E-03	1.E-04	1.E-03	1.E-04	1.E-03	1.E-04	1.E-03	1.E-04	3.E-07	3.E-08
Endosulfan I	5.E-05	NB	1.E-04	NB	5.E-05	NB	1.E-04	NB	5.E-05	NB	1.E-08	NB
Endosulfan II	9.E-05	NB	1.E-04	NB	9.E-05	NB	1.E-04	NB	9.E-05	NB	2.E-08	NB
Endosulfan sulfate	5.E-05	NB	5.E-05	NB	5.E-05	NB	5.E-05	NB	5.E-05	NB	1.E-08	NB
Endrin aldehyde	5.E-04	5.E-05	8.E-04	8.E-05	5.E-04	5.E-05	8.E-04	8.E-05	5.E-04	5.E-05	1.E-07	1.E-08
Endrin ketone	4.E-04	4.E-05	6.E-04	6.E-05	4.E-04	4.E-05	6.E-04	6.E-05	4.E-04	4.E-05	9.E-08	9.E-09
Gamma Chlordane	6.E-04	3.E-04	6.E-04	3.E-04	6.E-04	3.E-04	6.E-04	3.E-04	4.E-04	2.E-04	2.E-09	1.E-09
gamma-BHC (Lindane)	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE	NE	NE	NE
Heptachlor	7.E-03	7.E-04	7.E-03	7.E-04	7.E-03	7.E-04	7.E-03	7.E-04	2.E-05	2.E-06	5.E-09	5.E-10
Heptachlor epoxide	1.E-04	1.E-05	1.E-04	1.E-05	1.E-04	1.E-05	1.E-04	1.E-05	1.E-04	1.E-05	2.E-08	2.E-09
Methoxychlor	1.E-05	5.E-06	2.E-05	8.E-06	1.E-05	5.E-06	2.E-05	8.E-06	1.E-05	5.E-06	2.E-09	1.E-09
Total PAHs	, , ,	•	•	*	•	•	•	•	*		•	•
bis(2-ethylhexyl)phthalate	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE	NE	NE	NE
Di-n-butylphthalate	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	NE	NE	NE	NE
Diethylphthalate	0.E+00	NB	0.E+00	NB	0.E+00	NB	0.E+00	NB	NE	NB	NÉ	NB
Acenaphthylene	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
Fluoranthene	5.E-06	NB	5.E-06	NB	5.E-06	NB	5.E-06	NB	5.E-06	NB	NE	NB
Benzo(b)fluoranthene	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
Benzo(k)fluoranthene	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
Benzo(a)pyrene	1.E-01	1.E-02	1.E-01	1.E-02	1.E-01	1.E-02	1.E-01	1.E-02	NE	NE	NE	NE
Benzo(g,h,i)perylene	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
Indeno(1,2,3-c-d)pyrene	NB ]	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
Dibenz(a,h)anthracene	( NB	NB	NB	NB	NB	NB	NB	NB	NB	NB (	NB	NB
Dioxin - TEQ	7.E-01	7.E-02	1.E+00	1.E-01	7.E-01	7.E-02	1.E+00	1.E-01	3.E+00	3.E-01	2.E-03	2.E-04

<sup>3</sup>In this scenario, the muskrat was assumed to ingest blota (plants or snails), sediment, and surface water. The snail scenario is based on modeled snail concentrations using site-specific BAFs. The river otter is assumed to ingest fish, sediment, and surface water; the fish concentrations are modeled based on site specific BAFs.

Notes:

NE = Not evaluated (not detected in biota and, therefore, no BAF could be calculated)
NB = Benchmark not available

Average scenario uses area use factors and migration factors where appropriate

Maximum scenario assumes receptor is restricted to site

<sup>\*</sup> PAHs were evaluated as total PAHs for birds, but for individual compounds for mammals

Table 7-29b Results of Food Chain Modeling Sauget Area I Borrow Pit Lake

	SCENARIO <sup>1</sup>									
	River	Other-	River Ots	er-Borrow		Otter-	River Oth	г-Волож		
		Pt Fish		ngestion-	Волтом	Pit Fish	Pit Fish k			
	inges	ton-	Maximur	n shallow	Ingestion	- Average		mum		
ř :	Average	shallow	sedi	ment	combine	d shallow	combine	i shallow		
	sedir	ment			and deep	sediment	and deep	sediment		
		_								
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOVET	NOAEL	LOAEL		
	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard		
Compound	index	index	Index	Index	index	Index	Index	index		
2.4-0	9 E-06	2 E-08	9 E-06	2 E-06	9 E-08	2.E-08	9 E-06	2.E-06		
2.4-08	3 E-06	9 E-07	3 E-04	1 E-04	3 E-06	9.E-07	3.E-04	1.E-04		
Dicamba	1 E-05	3 E-06	1 E-03	3.E-04	1.E-05	3.E-06	1.E-03	3.E-04		
Dichloroprop	NB 5 E-04	NB I	NB EE CO	N/B	NB I	NB 2.E-04	NB 6500	NB 2 E-02		
MCPA		2.E-04	6 E-02 0.E+00	2 E-02 0 E+00	5 E-04	0.E+00	6.E-02	0.E+00		
MCPP Destachtementanei	0 E+00 6 E-06	0 E+00 6 E-07	6 E-04	6 E-05	0.E+00 6.E-06	6.E-07	0.E+00 6.E-04	6.E-05		
Pentachlorophenol Aluminum, Total	2 E-01	2 E-02	2.E+01	2.E+00	2.E-01	2 E-02	2.E+01	2.E+00		
Antimony	3 E-04	3 E-05	3 E-02	3 E-03	3.E-04	3.E-05	3E-02	3.E-03		
Arsenic, Total	6 E-05	NB NB	7 E-03	NB	6.E-05	NB	7.E-03	NB NB		
Barrum, Total	2.E-04	2 E-04	3 E-02	2.E-02	2.E-04	2.E-04	3.E-02	2E-02		
Beryllium, Total	7 E-06	6 E-07	8 E-04	7 E-05	7.E-06	6.E-07	8.E-04	7.E-05		
Cadmum, Total	2 E-05	2 E-06	2 E-03	2 E-04	2 E-05	2.E-06	2 E-03	2E-04		
Chromium, Total	4 E-07	N/B	7 E-05	NB	4 E-07	NB	7.E-05	NB		
Copper, Total	1 E-04	1 E-04	2 E-02	2 E-02	1.E-04	1.E-04	4.E-02	3.E-02		
liron:	NB	NB	NB	NB	NB	NB	NB	NB		
Lead, Total	1 E-04	1 E-05	2 E-02	2 E-03	1.E-04	1.E-05	2 E-02	2.E-03		
Manganese	1.E-04	4 E-05	2.E-02	5.E-03	1.E-64	4 E-05	2.E-02	5.E-03		
Mercury	9 E-03	2 E-03	2.E+00	5 E-01	9.E-03	2.E-03	2.E+00	5.E-01		
Molybdenum	8 E-05	8 E-06	1 E-02	1 E-03	8.E-05	8.E-06	1 E-02	1.E-03		
Nickel, Total		5 E-06	1.E-03	6 E-04	1.E-05	5.E-06	1 E-03	6.E-04		
Salanum	4.E-03	3 E-03	7 E-01	4.E-01	4 E-03	3.E-03	7.E-01	4.E-01		
Silver	3 E-07	3 E-06	3 E-05	3 E-06	3 E-07	3.E-08	3.E-05	3.E-06		
Vanadium, Total	1 E-03	1 E-04	2 E-01	2 E-02	1 E-03	1.E-04	2.E-01	2.E-02		
Zinc, Total Total DCDs	3 E-04	2 E-04	4 E-02	2 E-02	3.E-04	2.E-04	4.E-02	2E-02		
Total PCBs Total DOT	1 E-03	7 E-04	3 E-01	1.E-01	1.E-03	7.E-04	3.E-01	1.E-01		
Aidnin	4 E-05 0 E+00	7 E-06 0 E+00	6.E-03 0.E+00	1 E-03 0.E+00	4.E-05 0.E+00	7.E-06 0.0.E+00	6.E-03 0.E+00	1.E-03 0.E+00		
Alphe Chlordane	3 E-06	2.E-06	7.E-04	4 E-04	3.E-06	2.E-06	7.E-04	4.E-04		
delta-BHC	2 E-07	8 E-08	2 E-05	2 E-06	2 E-07	2E-06	2.E-05	2.E-06		
Diektrin	3 E-07	2 E-07	3 E-05	3 E-06	3 E-07	3.E-06	3.E-05	3.E-06		
Endosulfan I	2 E-07	NB.	3 E-05	NB	2 E-07	NB	3.E-05	NB		
Endosullan II	0 E+00	NB	0 E+00	NB	0 E+00	NB	0.E+00	NB		
Endosulfan sulfate	4 E-07	NB	6 E-05	NB	4.E-07	NB	6.E-05	NB		
Endrin aldehyde	4 E-07	4 E-06	5.E-05	5 E-06	4.E-07	4.E-08	5.E-05	5.E-06		
Endrin katone	2 E-07	2.E-06	2.E-05	2.E-06	2 E-07	2.E-08	2.E-05	2.E-06		
Gamma Chlordane	6 E-06	3 E-06	1 E-03	6.E-04	6.E-06	3.E-06	1.E-03	6.E-04		
gamme-BHC (Lindane)	6 E-09	6.E-10	6 E-07	6 E-06	6 E-09	6.E-10	6.E-07	6.E-08		
Heptachior	3 E-06	3 E-06	3 E-03	3 E-04	3 E-05	3.E-06	3.E-03	3.E-04		
Heptachlor epoxide	3 E-07	3 E-06	3 E-05	3 E-06	3.E-07	3.E-08	3.E-05	3.E-06		
Methoxychior	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0.E+00	0.E+00	0.E+00		
Total PAHs	35.00									
bis(2-ethylhexyl)phthalate	3 E-05	3 E-06	3 E-03	3.E-04	3.E-05	3.E-06	3.E-03	3.E-04		
Di-n-butylphthalate Custostobholos	2 E-07	5 E-06	2.E-05	5 E-06	2.E-07	5.E-08	2.E-05	5.E-06		
Diethylphthalate Acenachthylene	2.E-08 NB	NB NB	2.E-06	NB	2.E-06	NB S	2.E-06	NB NB		
Aceregianyene Ruoranthene	0 E+00	NB NB	NB 0 E+00	NB NB	NB CE+00	NB NB	NB 0 Exco	NB NB		
Perzo(b)fluoranthene	NB	NB NB	NB	NB NB	0 E+00	NB NB	0.E+00	NB NB		
oerzo(k)iluoranihene	NB	NB NB	NB NB	NB NB	NB NB	NB NB	NB NB	NB NB		
geusp(s)blueus pensp(r)mmenene		0 E+00	0.E+00	0 E+00	0 E+00	0 E+00	0.E+00	0.E+00		
Benzo(g.h.)parylane	NB	NB	NB	NB	NB	NB	NB	NB		
Indeno(1,2,3-c-d)pyrene	NB	NB	NB	NB NB	NB	NB	NB	NB NB		
Obenz(a,h)anthracene	NB	NB	NB	NB	NB	NB	NB	NB NB		
Digitin - TEQ	5 E-03	5 E-04	8 E-01	8 E-02	5.E-03	5 E-04	8.E-01	8.E-02		
<u></u> _		3 2 4		7 2 702	J		JV.			

In this scanano, the river otter is assumed to ingest fish, sediment, and surface

	SCENARIO <sup>2</sup>									
	Great Blu	e Heron-		ue Heron-	Great Blu	e Heron				
ľ	Вогтом	Pit Fish	Borrow	Pit Fish	Borrow	Pit Fish				
	Ingestion	-Average	Aver	age**	Ingestion-	-Maximum				
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL				
l	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard				
Compound	Index	Index	Index	Index	Index	Index				
2,4-D	NB	NB	NB	NB	NB	NB				
2,4-DB	2.E-05	NB	1.E-08	NB	3.E-05	NB				
Dicamba	NB	NB	NB	NB	NB	NB				
Dichloroprop	NB	NB	NB	NB	NB	NB ,				
MCPA	NB	NB	NB	NB	NB	NB				
MCPP	NB	NB	NB	NB	NB	NB				
Pentachlorophenol	NB	NB	NB	NB	NB	NB				
Aluminum, Total	4.E-02	NB	3.E-05	NB	8.E-02	NB				
Antimony	NB	NB	NB NB	NB	NB	NB				
Arsenic, Total	8.E-05	3.E-05	5.E-08	2.E-08	1.E-04	5.E-05				
Barium, Total	3.E-04 NB	1.E-04 NB	2.E-07	9.E-08 NB	7.E-04	3.E-04 NB				
Beryllium, Total Cadmium, Total	0.E+00	0.E+00	NB 0.E+00	0.E+00	NB 0.E+00	0.E+00				
Chromium, Total	5.E-02	1.E-02	3.E-05	7.E-06	9.E-02	0.E+00 2.E-02				
Copper, Total	3.E-02	2.E-03	2.E-06	1.E-06	6.E-03	4.E-03				
Iron	NB	NB	NB	NB	NB	NB				
Lead, Total	4.E-02	4.E-03	3.E-05	3.E-06	8.E-02	8.E-03				
Manganese	2.E-05	NB	2.E-08	NB	8.E-05	NB				
Mercury	4.E+00	4.E-01	3.E-03	3.E-04	1.E+01	1.E+00				
Molybdenum	4.E-05	4.E-06	3.E-08	3.E-09	5.E-05	5.E-06				
Nickel, Total	5.E-06	4.E-06	3.E-09	2.E-09	9.E-06	6.E-06				
Selenium	1.E-01	6.E-02	8.E-05	4.E-05	2.E-01	1.E-01				
Silver	NB	NB	NB	NB	NB	NB				
Vanadium, Total	3.E-05	NB	2.E-08	NB	6.E-05	NB				
Zinc, Total	2.E-01	3.E-02	2.E-04	2.E-05	4.E-01	4.E-02				
Total PCBs	5.E-02	5.E-03	3.E-05	3.E-06	1.E-01	1.E-02				
Total DDT Aldrin	5.E-01 NB	5.E-02	3.E-04	3.E-05	1.E+00	1.E-01				
Alpha Chlordane	9.E-05	NB 2.E-05	NB 6.E-08	NB 1.E-08	NB 3.E-04	NB 5.E-05				
delta-BHC	1.E-07	3.E-08	9.E-11	2.E-11	2.E-07	4.E-08				
Dieldrin	4.E-07	NB	3.E-10	NB	6.E-07	NB				
Endosulfan I	8.E-09	NB	5.E-12	NB	1.E-08	NB				
Endosulfan li	0.E+00	NB	0.E+00	NB	0.E+00	NB I				
Endosulfan sulfate	1.E-08	NB	7.E-12	NB	1.E-08	NB				
Endrin aldehyde	1.E-05	1.E-06	7.E-09	7.E-10	1.E-05	1.E-06				
Endrin ketone	9.E-06	9.E-07	6.E-09	6.E-10	1.E-05	1.E-06				
Gamma Chlordane	2.E-04	3.E-05	1.E-07	2.E-08	4.E-04	9.E-05				
gamma-BHC (Lindane)	6.E-08	6.E-09	4.E-11	4.E-12	9.E-08	9.E-09				
Heptachlor	NB	NB	NB	NB	NB	NB I				
Heptachlor epoxide	NB	NB	NB	NB	NB	NB I				
Methoxychlor	NB 3 E 04	NB	NB	NB	NB 2 F 04	NB 3 E OE				
bis(2-ethylhexyl)phthalate	3.E-04 2.E-02	3.E-05 NB	2.E-07 1.E-05	2.E-08 NB	3.E-04 3.E-02	3.E-05 NB				
Di-n-butylphthalate	1.E-02	1.E-03	7.E-05	7.E-07	1.E-02	1.E-03				
Diethylphthalate	NB	NB	NB	NB	NB	NB				
Acenaphthylene		*								
Fluoranthene	•	•	•	· • 1	•	•				
Benzo(b)fluoranthene	•	*	•	•	•	•				
Benzo(k)fluoranthene	•	•	•	*	•	•				
Benzo(a)pyrene	•	*			•	•				
Benzo(g,h,i)perylene		•	*	•	•	•				
Indeno(1,2,3-c-d)pyrene	*	•	•	*	•	•				
Dibenz(a,h)anthracene		•		*		*				
Dioxin - TEQ	6.E-02	6.E-03	4.E-05	4.E-06	1.E-01	1.E-02				

<sup>&</sup>lt;sup>2</sup>The great blue heron is assumed to ingest fish and surface water.

\*\*Indicates sensitivity analysis using larger foraging area (3 mile radius)

Table 7-20b Results of Food Chain Modeling Sauget Area I Borrow Pit Lake

	1			SCEN	VRIO <sup>3</sup>			
ĺ	Female	Muskrat-	Female	Muskra!-	Female I	Muskrat-	Female	Muskrat-
		Pt Clam		Prt Clam		Pit Clam		Pit Clam
	ingestion	-Average	Ingestion	Maximum	Incestion	-Average	Ingestion	Maximum
		sediment	. •	sediment	combined shallow		combined shallow ar	
			_		and	deep	deep s	ediment
		T						
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Į.	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard
Compound	Index	Index	Index	Index	Index	index	index	Index
2.4-0	3 E-05	6 E-06	3 E-05	6 E-06	3.E-05	6 E-06	3.E-05	6.E-06
2.4-08	0 E+00	0.E+00	0.E+00	0.E+00				
Dicambe	0 E+00	0 E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00
Dichloroprop	NB 05.00	NB 0 E i co	NB 05.00	NB or.co	0 F+00	NB 0 E t CC	NB 05:00	NB 05.00
MCPA	0 E+00	0 E+00	0 E+00	0 E+00	0.2	0.E+00	0.E+00	0.E+00
MCPP	6 E-01	2.E-01	6 E-01	2.E-01	6.E-01	2.E-01	6.E-01	2.E-01
Pentachlorophenol	0 E+00 4.E+01	0 E+00	0 E+00	0.E+00 5.E+00	0.E+00	0.E+00	0.E+00 5.E+01	0.E+00   5.E+00
Alumnum, Total	9 E-02	4.E+00 9 E-03	5.E+01 9 E-02	9 E-03	9 E-02	9.E-03	9.E-02	9.E-03
Antimony Arsenic, Total	2 E-01	NB NB	2 E-01	NB NB	2 E-01	NB	9.E-02 2.E-01	NB NB
Banum, Total	8 E-02	6.E-02	1.E-01	8.E-02	8 E-02	6.E-02	1.E-01	8.E-02
Beryllium, Total	2 E-03	2 E-04	3 E-03	2 E-04	2.E-03	2.E-04	3.E-03	2.E-04
Cadmum, Total	6 E-02	6 E-03	7 E-02	7 E-03	6 E-02	6.E-03	7.E-02	7.E-03
Chromum, Total	1 E-04	NB	2 E-04	NB	1.E-04	NB	2E-04	NB NB
Copper, Total	4 E-02	3 E-02	4 E-02	3 E-02	3 E-02	3.E-02	1.E-01	8.E-02
Bran	NB	NB	NB	NB	N/B	NB	NB	NB
Lead. Total	3 E-02	3 E-03	4 E-02	4 E-03	3 E-02	3 E-03	4 E-02	4.E-03
Manganese	5 E-02	1 E-02	7 E-02	2 E-02	5 E-02	1.E-02	7.E-02	2.E-02
Mercury	1 E-02	2.E-03	1 E-02	3 E-03	1.E-02	2.E-03	1.E-02	3.E-03
Molybdenum	5 E-02	5 E-03	6 E-02	6 E-03	5 E-02	5.E-03	6.E-02	6.E-03
Nicket, Total	4 E-03	2.E-03	4 E-03	2 E-03	4.E-03	2.E-03	4.E-03	2.E-03
Selienium	0 E+00	0 E+00	0 E+00	0.E+00	0. <del>E+0</del> 0	0.E+00	0.E+00	0.E+00
Silver	4 E-04	4 E-05	4 E-04	4 E-05	4.E-04	4.E-05	4.E-04	4.E-05
∀anadium, Total	5 E-01	5 E-02	6 E-01	6 E-02	5 E-01	5 E-02	6.E-01	6.E-02
Zinc, Total	5 E-02	2.E-02	7 E-02	4 E-02	5 E-02	3.E-02	1.E-01	5.E-02
Total PCBs	0 E+00	0 E+00	0 E+00	0 E+00	8 E-04	4.E-04	1.E-02	5.E-03
Total DOT	2 E-05	4 E-06	4 E-05	9 E-06	2 E-05	4.E-06	4.E-05	9.E-06
Aidnn	0 E+00	0.E+00	0.E+00	0.E+00				
Alpha Chlordane	2.E-06	9 E-07	4 E-06	2 E-06	2 E-06	9.E-07	4.E-06	2.E-06
delta-BHC	2 E-04	2.E-05	2 E-04	2.E-05	2 E-04	2.E-05	2.E-04	2.E-05
Dieldrin	1 E-04	1 E-05	1 E-04	1 E-05	1 E-04	1.E-05	1.E-04	1.E-05
Endosulian i	7 E-05	NB	1.E-04	NB	7 E-05	NB NB	1.E-04	NB
Endosulian II	0 E+00	NB	0 E+00	NB NB	0.E+00	NB I	0.E+00	NB
Endosulfan sulfate	1 E-04	NB 35.05	2 E-04	NB a c oc	1 E-04	NB 1	2E-04	NB 3505
Endrin aldehyde Endrin ketone	2 E-04	2.E-05 1.E-05	2 E-04	2 E-05 1 E-05	2.E-04	2.E-05 1.E-05	2.E-04 1.E-04	2.E-05 1.E-05
Gamma Chlordane	3 E-06	2.E-06	1 E-04 3 E-06	1.E-05 2.E-06	1.E-04 3.E-06	2.E-06	1.E-04 3.E-06	1.E-05 2.E-06
gamme-8HC (Lindane)	2 E-06	2 E-07	2 E-06	2 E-06	2 E-06	2.E-07	3.E-06	2.E-07
Historior	8 E-03	8 E-04	8 E-03	8 E-04	8 E-03	8.E-04	8.E-03	8.E-04
Heptachior econde	1 E-04	1 E-05	1 E-04	1.E-05	1 E-04	1.E-05	1.E-04	1.E-05
Methoxychlor	6 E-04	3 E-04	6 E-04	3 E-04	6 E-04	3.E-04	6.E-04	3.E-04
Total PAHs	•			•		•	•	
bis(2-ethylhexyl)phthalate	5 E-03	5 E-04	8 E-03	8.E-04	5 E-03	5.E-04	8.E-03	8.E-04
Di-n-butylphthalate	0 E+00	0 E+00	0 E+00	0 E+00	0.E+00	0.E+00	0.E+00	0.E+00
Distrytonthalate	1 E-05	NB	2 E-05	NB	1 E-05	NB	2 E-05	NB
Acenaphinylene	NB	NB	NB	NB	NB	NB	NB	NB
Fluoranthene	0 E+00	NB	0 E+00	NB	0.E+00	NB	0.E+00	NB
Benzo(b)fluoranthene	NB	NB	NB	NB	NB	NB	NB	NB
Benzo(k)fluoranthene	NB	NB	NB	NB	NB	NB	NB	NB
Benzo(a)pyrene	0 E+00	0 E+00	0 E+00	0 E+00	0.E+00	0.E+00	0.E+00	0.E+00
Benzo(g.hu)perylene	NB	NB	NB	NB	NB	NB	NB	NB
Indeno(1,2,3-c-d)pyrene	NB	NB	NB	NB	NB	NB	NB	NB
Dibenz(a,h)enthracene	NB	NB	NB	NB	NB	NB	NB	NB
Diaxan - TEQ	1 E-01	1 E-02	2 E-01	2.E-02	1.E-01	1.E-02	2.E-01	2.E-02

<sup>&</sup>lt;sup>3</sup>The mustirat is assumed to ingest clams, sediment, and surface water.

Hazard   Hazard   Hazard   Hazard   Index	gestion- ombined nd deep
Borrow Pit Clam Ingestion—Average shallow sediment   Sediment   Pit Clam Ingestion—Average shallow sediment   Sediment   Average combined shallow and deep sediment   Sh	gestion-ombined and deep ent LOAEL Hazard Index 2.E-06 0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
NOAEL   LOAEL   Hazard   Haz	LOAEL Hazard Index 2.E-06 0.E+00 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
NOAEL   Hazard   H	LOAEL Hazard Index 2.E-06 0.E+00 0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
NOAEL   Hazard   Index	LOAEL Hazard Index 2.E-06 0.E+00 0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
Hazard   Index   Ind	Hazard Index 2.E-06 0.E+00 0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
Hazard   Index   Ind	Hazard Index 2.E-06 0.E+00 0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
Compound	2.E-06 0.E+00 0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
2,4-D	0.E+00 0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
Dicamba	0.E+00 NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
Dichloroprop   NB	NB 0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
MCPA   0.E+00   0.E	0.E+00 1.E-01 0.E+00 2.E+00 3.E-03
MCPP	1.E-01 0.E+00 <b>2.E+00</b> 3.E-03
Pentachlorophenol   O.E+00	0.E+00 2.E+00 3.E-03
Aluminum, Total	2.E+00 3.E-03
Antimony	3.E-03
Arsenic, Total   9.E-04   NB   9.E-02   NB   9.E-04   NB   9.E-02   2.E-04   2.E-04   3.E-02   2.E-04   2.E-04   3.E-02   2.E-04   2.E-04   3.E-02   3.E-02   3.E-02   3.E-03   3.E-04   3.E-05   3.E-0	
Barium, Total   2.E-04   2.E-04   3.E-02   2.E-02   2.E-04   2.E-04   3.E-02   3.E-02   3.E-04   3.E-04   3.E-04   3.E-05   3.E-05   3.E-03   3.E-04   3.E-05   3.E-02   3.E-03   3.E-04   3.E-05   3.E-05   3.E-02   3.E-03   3.E-05   3.E	
Beryllium, Total   7.E-06   6.E-07   8.E-04   7.E-05   7.E-06   6.E-07   8.E-04   3.E-04   3.E-05   3.E-02   3.E-03   3.E-04   3.E-05   3.E-02   3.E-03   3.E-04   3.E-05   3.E-02   3.E-05   3.E-05   3.E-02   3.E-05   3.E-05   3.E-02   3.E-05	2.E-02
Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, Total   Cadmium, C	7.E-05
Copper, Total   1.E-04   1.E-04   1.E-04   1.E-02   1.E-02   1.E-04   1.E-04   1.E-04   1.E-05   1.E-02   1.E-03   1.E-04   1.E-05   1.E-02   1.E-03   1.E-04   1.E-05   1.E-02   1.E-03   1.E-04   1.E-05   1.E-02   1.E-03   1.E-04   1.E-05   1.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-03   1.E-04   4.E-03   1.E-04   4.E-03   1.E-04   4.E-03   1.E-04   4.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-03   1.E-04   1.E-03   1.E-03   1.E-04   1.E-03   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-03   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-04   1.E-05   1.E-04   1.E-04   1.E-04   1.E-05   1.E-04   1.E-05   1.E-04   1.E-05   1.E-04   1.E-05   1.E-04   1.E-05   1.E-06   1.E	3.E-03
Iron	NB
Lead, Total   1.E-04   1.E-05   1.E-02   1.E-03   1.E-04   1.E-05   1.E-02   1.E-02   1.E-04   4.E-05   2.E-02   5.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-05   2.E-02   1.E-03   1.E-04   4.E-03   1.E-04   4.E-03   1.E-03   1.E-04   1.E-03   1.E-03   1.E-04   1.E-03   1.E-03   1.E-04   1.E-05   5.E-06   1.E-03   1.E-05   1.E-03   1.E-05   1.E-03   1.E-05   1.E-03   1.E-05   1.E-03   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-03   1.E-04   1.E-05   1.E-05   1.E-04   1.E-04   1.E-05   1.E-05   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-06   1.E-05   1.E-0	3.E-02
Manganese         1.E-04         4.E-05         2.E-02         5.E-03         1.E-04         4.E-05         2.E-02           Mercury         3.E-05         7.E-06         4.E-03         9.E-04         3.E-05         7.E-06         4.E-03           Molybdenum         8.E-05         8.E-06         1.E-02         1.E-03         8.E-05         8.E-06         1.E-02           Nickel, Total         1.E-05         5.E-06         1.E-03         6.E-04         1.E-05         5.E-06         1.E-03           Selenium         0.E+00         1.E-04         2.E-01         2.E-04         1.E-04         2.E-01         td>	NB
Mercury         3.E-05         7.E-06         4.E-03         9.E-04         3.E-05         7.E-06         4.E-03           Molybdenum         8.E-05         8.E-06         1.E-02         1.E-03         8.E-05         8.E-06         1.E-02           Nickel, Total         1.E-05         5.E-06         1.E-03         6.E-04         1.E-05         5.E-06         1.E-03           Selenium         0.E+00         2.E-04         >1.E-03</td>	1.E-03
Molybdenum	5.E-03
Nickel, Total         1.E-05         5.E-06         1.E-03         6.E-04         1.E-05         5.E-06         1.E-03           Selenium         0.E+00         2.E-04         2.E-04         2.E-04         2.E-04         2.E-04         2.E-01         2.E-02         2.E-04         1.E-04         2.E-02         2.E-04         1.E-04         2.E-02         2.E-04         1.E-04         2.E-02         2.E-04         1.E-08         2.E-02         2.E-04         1.E-08         3.E-03         3.E-08         3.E-00         3.E-08         3.E-00         3.E-08         3.E-08         3.E-08         3.E-05         3.E-06         6.E-08         1.E-08         1.E-05         0.E+00         0.E+00         0.E+00         0.E+00         0.E	9.E-04 1.E-03
Selenium	6.E-04
Silver   2.E-06   2.E-07   2.E-04   2.E-05   2.E-06   2.E-07   2.E-04   2.E-07   2.E-04   2.E-07   2.E-04   2.E-01   2.E-02   1.E-03   1.E-04   2.E-01   2.E-02   1.E-03   1.E-04   2.E-01   2.E-01   2.E-02   2.E-04   1.E-04   4.E-02   2.E-02   2.E-04   1.E-04   4.E-02   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-01   2.E-02   2.E-04   1.E-04   4.E-02   2.E-02   2.E-04   1.E-04   4.E-02   2.E-01   2.E-01   2.E-03   3.E-06   3.E-06   3.E-03   3.E-03   3.E-05   3.E-06   3.E-08   3.E-05   3.E-06   3.E-07   3.E-08   3.E-05   3.E-06   3.E-07   3.E-08   3.E-05   3.E-06   3.E-07   3.E-08   3.E-05   3.E-05   3.E-07   3.E-08   3.E-05   3.E-05   3.E-07   3.E-08   3.E-05   3	0.E+00
Zinc, Total   2.E-04   1.E-04   3.E-02   2.E-02   2.E-04   1.E-04   4.E-02   1.E-04   0.E+00   0.E+00   0.E+00   0.E+00   0.E+00   0.E+00   3.E-06   1.E-08   1.E-05   3.E-06   1.E-08   1.E-05   3.E-06   0.E+00   3.E-05   3.E-06   3.E-07   3.E-08   3.E-05   0.E+00   3.E-05   0.E+00   0.E+0	2.E-05
Total PCBs         0.E+00         0.E+00         0.E+00         0.E+00         3.E-06         1.E-06         3.E-03           Total DDT         6.E-08         1.E-08         1.E-05         3.E-06         6.E-08         1.E-08         1.E-05           Aldrin         0.E+00         0.E+00         0.E+00         0.E+00         0.E+00         0.E+00         0.E+00           Alpha Chlordane         5.E-09         3.E-09         1.E-06         6.E-07         5.E-09         3.E-09         1.E-06           delta-BHC         2.E-07         2.E-08         2.E-05         2.E-06         2.E-07         2.E-08         2.E-05           Dieldrin         3.E-08         3.E-08         3.E-08         3.E-08         3.E-05           Endosulfan I         2.E-07         NB         3.E-05         NB         2.E-07         NB         3.E-05           Endosulfan II         0.E+00         NB         0.E+00         NB         0.E+00         NB         0.E+00           Endosulfan sulfate         4.E-07         NB         6.E-05         NB         4.E-07         NB         6.E-05           Endrin aldehyde         4.E-07         4.E-08         5.E-06         5.E-06         4.E-07         4.E-08 <td>2.E-02</td>	2.E-02
Total DDT         6.E-08         1.E-08         1.E-05         3.E-06         6.E-08         1.E-08         1.E-05           Aldrin         0.E+00         1.E-08         1.E-08         1.E-08         1.E-08         0.E+00         0.E+00         0.E+00         0.E+00         1.E-08         1.E-08         1.E-08         1.E-08         1.E-08         0.E+00         0.E+00         0.E+00         0.E+00         1.E-08         02</td>	2.E-02
Aldrin         0.E+00         1.E-06         d.E-05         2.E-07         2.E-08         2.E-05         2.E-05         2.E-06         2.E-07         2.E-08         2.E-05         3.E-05         3.E-06         3.E-07         3.E-08         3.E-05         NB         3.E-07         NB         3.E-05         NB         3.E-07         NB         3.E-05         NB         0.E+00	2.E-03
Alpha Chlordane         5.E-09         3.E-09         1.E-06         6.E-07         5.E-09         3.E-09         1.E-06           delta-BHC         2.E-07         2.E-08         2.E-05         2.E-06         2.E-07         2.E-08         2.E-05           Dieldrin         3.E-07         3.E-08         3.E-05         3.E-06         3.E-07         3.E-08         3.E-05           Endosulfan I         2.E-07         NB         3.E-05         NB         2.E-07         NB         3.E-05           Endosulfan II         0.E+00         NB         0.E+00         NB         0.E+00         NB         0.E+00           Endosulfan sulfate         4.E-07         NB         6.E-05         NB         4.E-07         NB         6.E-05           Endrin aldehyde         4.E-07         4.E-08         5.E-05         5.E-06         4.E-07         4.E-08         5.E-05	3.E-06
delta-BHC         2.E-07         2.E-08         2.E-05         2.E-06         2.E-07         2.E-08         2.E-05           Dieldrin         3.E-07         3.E-08         3.E-05         3.E-06         3.E-07         3.E-08         3.E-05           Endosulfan I         2.E-07         NB         3.E-05         NB         2.E-07         NB         3.E-05           Endosulfan II         0.E+00         NB         0.E+00         NB         0.E+00         NB         0.E+00           Endosulfan sulfate         4.E-07         NB         6.E-05         NB         4.E-07         NB         6.E-05           Endrin aldehyde         4.E-07         4.E-08         5.E-06         5.E-06         4.E-07         4.E-08         5.E-05	0.E+00
Dieldrin   3.E-07   3.E-08   3.E-05   3.E-06   3.E-07   3.E-08   3.E-05   Endosulfan	6.E-07 2.E-06
Endosulfan I 2.E-07 NB 3.E-05 NB 2.E-07 NB 3.E-05 Endosulfan II 0.E+00 NB 0.E+00 NB 0.E+00 NB 0.E+00 Endosulfan sulfate 4.E-07 NB 6.E-05 NB 4.E-07 NB 6.E-05 Endrin aldehyde 4.E-07 4.E-08 5.E-05 5.E-06 4.E-07 4.E-08 5.E-05	3.E-06
Endosulfan II 0.E+00 NB 0.E+00 NB 0.E+00 NB 0.E+00 Endosulfan sulfate 4.E-07 NB 6.E-05 NB 4.E-07 NB 6.E-05 Endrin aldehyde 4.E-07 4.E-08 5.E-05 5.E-06 4.E-07 4.E-08 5.E-05	NB
Endosulfan sulfate 4.E-07 NB 6.E-05 NB 4.E-07 NB 6.E-05 Endrin aldehyde 4.E-07 4.E-08 5.E-05 5.E-06 4.E-07 4.E-08 5.E-05	NB
· · · · · ·   · · ·   · · · · ·   · · · · · ·   ·	NB
Endrin ketone   2.E-07   2.E-08   2.E-05   2.E-08   2.E-07   2.E-05	5.E-06
,	2.E-06
Gamma Chlordane   9.E-09   5.E-09   1.E-06   5.E-07   9.E-09   5.E-09   1.E-06	5.E-07
gamma-BHC (Lindane) 6.E-09 6.E-10 6.E-07 6.E-08 6.E-09 6.E-10 6.E-07	6.E-08
Heptachlor   4.E-05   4.E-06   4.E-03   4.E-04   4.E-05   4.E-06   4.E-03	4.E-04
Heptachlor epoxide 3.E-07 3.E-08 3.E-05 3.E-06 3.E-07 3.E-08 3.E-05 3.E-05 3.E-06 3.E-07 3.E-08 3.E-05 3.E-06 3.E-07 3.E-08 3.E-08 3.E-05 3.E-08 3.E-	3.E-06
Methoxychlor 3.E-06 1.E-06 3.E-04 1.E-04 3.E-06 1.E-06 3.E-04 Total PAHs	1.E-04
bis(2-ethylhexyl)phthalate 2.E-05 2.E-06 4.E-03 4.E-04 2.E-05 2.E-06 4.E-03	4.E-04
	0.E+00
Diethylphthalate 7.E-08 NB 1.E-05 NB 7.E-08 NB 1.E-05	NB
Acenaphthylene NB NB NB NB NB NB	NB
Fluoranthene 0.E+00 NB 0.E+00 NB 0.E+00 NB 0.E+00	NB
Benzo(b)fluoranthene NB NB NB NB NB NB NB	NB
Benzo(k)fluoranthene NB NB NB NB NB NB	N.C
	NB
Benzo(g,h,i)perylene NB NB NB NB NB NB NB NB NB NB NB NB NB	0.E+00
Indeno(1,2,3-c-d)pyrene	0.E+00 NB
Dioxin - TEQ 4.E-04 4.E-05 6.E-02 6.E-03 4.E-04 4.E-05 6.E-02	0.E+00

<sup>&</sup>lt;sup>4</sup>In this scenario, the river otter is assumed to ingest clams, sediment, and surface water.

	SCENARIO <sup>5</sup>								
	Mallar	d Duck-	Malla	d Duck-		Duck-	Mallad Du	ck-Borrow	
		Pit Shrimo		Pit Shining		Hi Shrimp		Ingestion-	
l .	Ingestion	n-Average	Ingestion	n-Maximum	Ingestion	-Average	Maximum	combined	
	shallow	sediment	shallow	sediment	combine	d shallow	shallow	and deep	
					and deep	sediment	sedi	ment	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL.	LOAEL	
J	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	
Compound	Index	Index	Index	index	Index	Index	index	index	
2.4-0	NB	NB.	NB	NB	NB	NB	NB	NB	
2.4-08	0 E+00	NB	0 E+00	NB	0 E+00	NB	0.E+00	NB	
Осатов	NB	NB	NB	NB	NB	NB	NB NB	NB	
Dichloroprop MCPA	NB NB	NB NB	NB NB	NB NB	NB NB	NB NB	NB NB	NB NB	
MCPP	NB	NB	NB	NB NB	NB NB	NB	NB	NB	
Pentachlorophenol	NB	NB	NB	NB	NB	NB	NB	NB	
Aluminum, Total	2 E-03	NB	3.E-01	NB	2.E-03	NB	3.E-01	NB	
Antimony	NB	NB	NB	NB I	NB	NB	NB	NB	
Arsenic, Total	4 E-05	2.E-05	5.E-03	2 E-03	4 E-05	2 E-05	5.E-03	2 E-03	
Barium, Total	2 E-04	1.E-04	3.E-02	2 E-02	2.E-04	1.E-04	3.E-02	2.E-02	
Beryllium, Total	NB	NB	NB	NB	NB	NB	NB	NB	
Cadmium, Total	2 E-05	1 E-06	3 E-03	2 E-04	2.E-05	1 E-06	3.E-03	2.E-04	
Chromium, Total	1 E-03	2.E-04	1.E-01	3 E-02	1 E-03	2.E-04	1.E-01	3.E-02	
Copper, Total	6 E-04	4 E-04	7.E-02	6 E-02	6 E-04	4.E-04	8.E-02	6.E-02	
tron	NB	NB	NB	NB	NB	NB	NB	NB	
Lend, Total	2 E-03	2 E-04	2.E-01	2 E-02	2 E-03	2E-04	2E-01	2.E-02	
Mangenese	2 E-05	NB .	2 E-03	NB	2.E-05	NB	2.E-03	NB	
Mercury	2E-04	2 E-05	4.E-02	4 E-03	2.E-04	2.E-05	4.E-02	4.E-03	
Molybdenum Nickel, Total	3 E-06	3 E-07 6 E-06	5.E-04	5 E-05	3 E-06 8 E-06	3.E-07	5.E-04 1.E-03	5.E-05 8.E-04	
Selectum	8 E-06 0 E+00	0 E+00	1 E-03 0 E+00	8 E-04 0 E+00	0.E+00	6.E-06 0 E+00	0.E+00	0.E+00	
Sher	NB	NB	NB	NB	NB	NB	NB	NB	
Vanadium, Total	4 E-05	NB	6 E 03	NB	4.E-05	NB	6.E-03	NB	
Zinc. Total	4 E-03	4 E-04	5 E-01	5 E-02	4.E-03	4.E-04	7.E-01	7.E-02	
Total PCBs	0 E+00	0 E+00	0 E+00	0 E+00	4.E-06	4 E-07	6.E-03	6.E-04	
Total DDT	3 E-05	3 E-06	7 E-03	7 E-04	3 E-05	3 E-06	7.E-03	7.E-04	
Aldrin	NB	NB.	NB	NB	NB	NB	NB	NB	
Alphe Chlordane	1 E-08	2 E-09	2 E-06	5 E-07	1.E-08	2.E-09	2.E-06	5.E-07	
deta-BHC	2.E-09	4 E-10	2.E-07	6 E-06	2.E-09	4.E-10	2.E-07	6.E-06	
Detdrin	9 E-06	NB	1.E-05	NB	9 E-08	NB	1.E-05	NB	
Endosullan I	4 E-09	NB	8 E-07	NB	4 E-09	NB	8.E-07	NB I	
Endosullan II	0 E+00	NB NB	0 E+00	NB NB	0 E+00	NB NB	0.E+00	NB NB	
Endosullan sulfate Endon aldehyde	9 E-09 2 E-06	NB 2.E-07	2.E-06 4.E-04	NB 4 E-05	9.E-09 2.E-06	NB 2 E-07	2.E-06 4.E-04	NB 4.E-05	
Endon kelone	1 E-06	1 E-07	1.E-04	1 E-05	1.E-06	1.E-07	1.E-04	1.E-05	
Gamma Chlordane	2 E-08	3 E-09	2.E-06	4 E-07	2.E-06	3.E-09	2.E-06	4.E-07	
gemme-BHC (Lindane)	3 E-08	3 E-09	4 E-06	4 E-07	3 E-08	3.E-09	4.E-06	4.E-07	
Heptachlor	NB	NB	NB	NB	NB	NB	NB	NB	
Heptachtor epoxide	NB	NB	NB	NB	NB	NB	NB	NB	
Methacychlor	NB	NB	NB	NB	NB	NB	NB	NB	
Total PAHs	0 E+00	0 E+00	0.E+00	0 E+00	0 E+00	0.E+00	0.E+00	0.E+00	
bis(2-ethylhexyl)phthalate	0 E+00	NB	0 E+00	NB	0 E+00	NB	0.E+00	NB	
	0 E+00	0 E+00	0.E+00	0 E+00	0.E+00	0. <del>E+0</del> 0	0.E+00	0.E+00	
Dietrytphthalate	NB	NB	NB	NB	NB	NB	NB	NB	
Acunaphthylene			: 1	:			:		
Fluoranthene Barrach Marraethana			: 1			•		:	
Benzo(b)fluoranthene Benzo(k)fluoranthene			.			,		:	
Benzo(x)nucranenere Benzo(a)pyrene			.	.		•	•		
Benzo(a.h.)perylene	. 1		.	.	•	•	•	•	
Indeno(1,2,3-c-d)pyrene		.	. 1		•	•	•		
Diberz(a,h)entracene		.	.		•	•	•		
Diguin - TEQ	4 E-04	4 E-05	5 E-02	5 E-03	4 E-04	4 E-05	5.E-02	5.E-03	
			32-02	32-00			V.L-V4	- Jac 400	

 $<sup>^{5}</sup>$ in this scenario, the mallard is assumed to ingest strimp, sediment, and surface water

	T	SCENARIO <sup>6,7</sup>								
	Tree S	wallow-	Tree Swa	llow-Insect		le-Borrow	Baid Eagle	-Borrow Pit		
ļ	Borrow	Pit Insect		n-Average		ngestion-		gestion		
	Ingestion	n-Average	combined	shallow and	Ave	rage	Max	imum		
i	shallow	sediment		ediment		•				
	<u> </u>	Γ				Г. <del></del>				
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL		
	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard	Hazard		
Compound	Index	Index	Index	Index	Index	Index	Index	Index		
2,4-D	NB	NB	NB	NB	NB	NB	NB	NB		
2,4-DB	0.E+00	NB	0.E+00	NB I	0.E+00	NB	0.E+00	NB		
Dicamba	NB	NB	NB	NB	NB	NB	NB	NB		
Dichloroprop	NB	NB	NB	NB	NB	NB	NB	NB		
MCPA	NB	NB	NB	NB	NB	NB	NB	NB		
MCPP	NB	NB	NB	NB I	NB	NB	NB	NB		
Pentachlorophenol	NB	NB	NB	NB	NB	NB	NB	NB		
Aluminum, Total	3.E+00	NB	3.E+00	NB	3.E-05	NB	4.E-02	NB		
Antimony	NB	NB	NB 5 E O2	NB	NB 1 E 07	NB	NB 1 E O4	NB 4 E OE		
Arsenic, Total	5.E-02	2.E-02	5.E-02	2.E-02	1.E-07	5.E-08	1.E-04	4.E-05		
Barium, Total	1.E-03	6.E-04	1.E-03	6.E-04	4.E-07	2.E-07	6.E-04	3.E-04		
Beryllium, Total	NB 5.E-01	NB 4.E-02	NB EE04	NB 4500	NB 0.E+00	NB 0.E+00	NB 0.E+00	NB 0.E+00		
Cadmium, Total	,	,	5.E-01	4.E-02	1.E-04	,				
Chromium, Total Copper, Total	2.E+00 3.E-01	4.E-01 2.E-01	2.E+00 3.E-01	4.E-01 2.E-01	1.E-04 3.E-06	2.E-05 2.E-06	1.E-01 2.E-03	2.E-02 2.E-03		
• •	NB	NB		1	3.E-06 NB					
Iron Lead, Total	3.E-01	3.E-02	NB 3.E-01	NB 3.E-02	4.E-05	NB 4.E-06	NB 3.E-02	NB 3.E-03		
	1.E-04	NB	1.E-04	NB	4.E-03	NB	6.E-05	NB		
Manganese Mercury	4.E+00	4.E-01	4.E+00	4.E-01	2.E-03	2.E-04	5.E+00	5.E-01		
Molybdenum	2.E-04	2.E-05	2.E-04	2.E-05	6.E-08	6.E-09	4.E-05	4.E-06		
Nickel, Total	2.E-02	2.E-03	2.E-04 2.E-02	2.E-03 2.E-02	8.E-09	6.E-09	7.E-06	5.E-06		
Selenium	0.E+00	0.E+00	0.E+00	0.E+00	1.E-04	6.E-05	2.E-01	8.E-02		
Silver	NB	NB	NB	NB	NB	NB	NB	NB		
Vanadium, Total	1.E-04	NB	1.E-04	NB	5.E-08	NB	5.E-05	NB		
Zinc, Total	3.E+00	3.E-01	3.E+00	3.E-01	2.E-04	3.E-05	2.E-01	2.E-02		
Total PCBs	0.E+00	0.E+00	3.E+01	3.E+00	1.E-04	1.E-05	2.E-01	2.E-02		
Total DDT	3.E+00	3.E-01	6.E+00	6.E-01	1.E-03	1.E-04	1.E+00	1.E-01		
Aldrin	NB	NB	NB	NB	NB	NB	NB	NB		
Alpha Chiordane	0.E+00	0.E+00	0.E+00	0.E+00	5.E-07	9.E-08	7.E-04	1.E-04		
delta-BHC	6.E-07	2.E-07	6.E-07	2.E-07	2.E-10	5.E-11	1.E-07	4.E-08		
Dieldrin	2.E-06	NB	2.E-06	NB	7.E-10	NB	5.E-07	NB		
Endosulfan I	4.E-08	NB	4.E-08	NB	1.E-11	NB	9.E-09	NB		
Endosulfan II	0.E+00	NB	0.E+00	NB	0.E+00	NB	0.E+00	NB		
Endosulfan sulfate	2.E-03	NB	4.E-03	NB	2.E-11	NB	1.E-08	NB		
Endrin aldehyde	5.E-05	5.E-06	5.E-05	5.E-06	2.E-08	2.E-09	1.E-05	1.E-06		
Endrin ketone	4.E-02	4.E-03	8.E-02	8.E-03	1.E-08	1.E-09	1.E-05	1.E-06		
Gamma Chlordane	4.E-03	8.E-04	1.E-02	2.E-03	8.E-07	2.E-07	1.E-03	2.E-04		
gamma-BHC (Lindane)	3.E-07	3.E-08	3.E-07	3.E-08	1.E-10	1.E-11	7.E-08	7.E-09		
Heptachlor	NB	NB	NB	NB	NB	NB	NB	NB		
Heptachlor epoxide	NB	NB	NB	NB	NB	NB	NB	NB		
Methoxychlor	NB	NB	NB	NB	NB	NB	NB	NB		
Total PAHs	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00		
ois(2-ethylhexyl)phthalate	0.E+00	NB	0.E+00	NB	1.E-05	NB	1.E-02	NB		
Di-n-butylphthalate	0.E+00	0.E+00	0.E+00	0.E+00	5.E-05	5.E-06	3.E-02	3.E-03		
Diethylphthalate	NB	NB	NB	NB	NB	NB	NB	NB		
Acenaphthylene			*	• •	•			*		
Fluoranthene	;	•	•		•	•	•			
Benzo(b)fluoranthene	1 : 1	•	•	*	•			•		
Benzo(k)fluoranthene		•		*	•	٠. ا	•			
Benzo(a)pyrene		•	•		•	l :	•	•		
Benzo(g,h,i)perylene		•			•	•	:	•		
ndeno(1,2,3-c-d)pyrene	:	•		*	•		! :	•		
Dibenz(a,h)anthracene		4 5 4	0 E-00	3.504	4 5 04	4505	45.4	4500		
Dioxin - TEQ	1.E+00	1.E-01	3.E+00	3.E <u>-01</u>	1.E-04	1.E-05	1.E-01	1.E-02		

<sup>&</sup>lt;sup>6</sup>The tree swallow is assumed to ingest insects and surface water. Insect concentrations were modeled using site-specific BAFs, literature BSAFs, and literature regression equations.

#### Notes

NB = Benchmark not available

Average scenario uses area use factors and migration factors where appropriate

Maximum scenario assumes receptor is restricted to site

Bolded values indicate a Hazard Index greater than 1

<sup>&</sup>lt;sup>7</sup>The bald eagle is assumed to ingest fish and surface water.

<sup>\*</sup>PAHs were evaluated as total PAHs for birds, but as individual compounds for mammals

Table 7-21

Comparison of Surface Water Concentrations in Dead Creek Section F to Wildlife Benchmarks

Sauget Area I

							NOAEL-	Based Benchmarks 1
Sample ID: Compounds	SW-CSF-S1 Concentration	ER Q	SW-CSF-S2 Concentration	ER Q	SW-CSF-S3 Concentration	ER Q	Water	Endpoint Species
Metals (mg/l)	<del> </del>	┢		┝		-	water	Enupoliti Species
Aluminum Arsenic Barium Copper Iron Lead Manganese Molybdenum	0.039 0.01 0.13 0.0016 0.5 0.005 0.082 0.01	חנה ניחנ	0.15 0.0032 0.13 0.002 0.55 0.0022 0.1		0.55 0.0049 0.12 0.012 1 0.0037 0.14 0.0028	) ) )	4.474 0.292 23.1 65.2 NA 4.86 377 0.6	Whitetail deer Whitetail deer Whitetail deer Whitetail deer Rough-winged Swallow Whitetail deer Whitetail deer
Nickel Zinc SVOC (ug/l)	0.0069 0.0073	J	0.013 0.035	J	0.021 0.075	J	171.36 62.3	Whitetail deer Rough-winged Swallow
Fluoranthene Dioxins (ug/l) 2,3,7,8-TCDD TEQ Mammal 2,3,7,8-TCDD TEQ Bird	0.7 9.01197E-06 8.92962E-06	J	10 1.5012E-06 8.784E-07	U	10 1.5583E-06 9.922E-07	U	NA 0.0007 0.0602	Little Brown Bat Rough-winged swallow

Only COPCs detected in surface water in Dead Creek Sector F were included in this table.

NA = Benchmark not available

<sup>&</sup>lt;sup>1</sup> Sample, BE, DM Opresko, GW Suter. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. Prepared for U.S. Department of Energy. Oak Ridge National Laboratory. June 1996. ES/ER/TM-86/R3.

### Table 7-22 Comparison of Surface Water Concentrations in the Borrow Pit Lake to Wildlife Benchmarks Sauget Area I

							NOAEL-	Based Benchmarks 1
Sample ID:	SW-BPL-S1		SW-BPL-\$2		SW-BPL-\$3	1		1
	Concentration	ER Q	Concentration	ER Q	Concentration	ER Q	1	ì
Compounds				<u> </u>			Water	Endpoint Species
Metals (mg/l)								
Alumenum	3.4		0 71	ł	0 65	1	4.474	Whitetail deer
Arsenic	0.015	1	0 0079	J	0 012		0.292	Whitetail deer
Banum	0 32		0 12		0.045		23.1	Whitetail deer
Chromum	0 0041	J	0 01	U	0.01	U	4.3	Rough-winged Swallow
Copper	0 0074	J	0 0036	J	0 0048	J	65.2	Whitetail deer
tron	8 7	J	1.6	J	1 3	J	NA	
Lead	0 02		0 002	) :	0 0029	J	4.86	Rough-winged Swallow
Manganese	17		0.13		0.17	J I	377	Whitetail deer
Molybdenum	0 0035	J	0 01	U	0.004	J	0.6	Whitetail deer
Nickel	0 015	J	0 012	J	0.0077	J	171.36	Whitetail deer
Zinc	0 048		0.027		0.017	J	62.3	Rough-winged Swallow
Pesticides (ug/l)						ii		
delta-BHC	0 00013	J	0 0022	J	0 012	lυl	100 <sup>2</sup>	River Otter
Dieldrin	0 1	U	0.1	U	0 001	IJ	86	Whitetail deer
Endosulfan i	0 0024	J	0 05	υ	0 0015	ا ز ا	640 <sup>a</sup>	Whitetail deer
Endosulfan sulfate	0 1	U	0.1	υ	0.0032	J	640 °	Whitetail deer
Endon	0 1	Ų	0 1	υ	0.00095	ı	43 °	Rough-winged Swallow
Endrin aldehyde	0 0032	J	0.1	ן ט	0 0016	J	43 <sup>2</sup>	Rough-winged Swallow
Endnn ketone	0.1	υ	0.1	υl	0.0027	J	43 3	Rough-winged Swallow
gamma-BHC (Lindane)	0 019	υl	0 0038	J	0.0024	J	8590	Rough-winged Swallow
Heptachior	0 0026	J	0 0022	j	0 0029	J	557	Whitetail deer
Heptachlor epoxide	0 00096	ı	0 0009	J	0.05	U	557 °	Whitetail deer
SVOC (ug/l)								ĺ
Diaxins (ugfl)		1						
2,3,7,8-TCDD TEQ Mammal <sup>2</sup>	8 5902E-07		7 453E-07		4 8413E-07		0.0007	Little Brown Bat
2,3,7,8-TCDO TEQ Bird 3	3 4692E-07	J	3 475E-07		2 8163E-07	1 }	0.0602	Rough-winged swallow

Only COPCs detected in surface water in the Borrow Pit are included in this table.

NA = Benchmark not available

<sup>&</sup>lt;sup>1</sup> Sample, BE, DM Opresko, GW Suter 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. Prepared for U.S. Department of Energy. Oak Ridge National Laboratory. June 1996. ES:ER/TM-86/R3.

<sup>&</sup>lt;sup>2</sup> Value represents BHC-mixed isomers

<sup>&</sup>lt;sup>3</sup> Mammal and bird TEQ values were calculated for 2,3,7,8-TCDD

Value for Endosulfan was used

<sup>&</sup>lt;sup>3</sup> Value for Endrin was used

<sup>&</sup>lt;sup>1</sup> Value for Heptachlor was used

Table 7-23 Shrimp Concentrations in the Borrow Pit Lake and both Reference Areas Sauget Area I

	Site	Reference	Reference
Compound	Concentration	Maximum	Average
Herbicides (ug/kg)			
2,4-D	ND	ND	ND
2,4-DB	ND	ND	ND
Dicamba	ND	ND	ND
Dichloroprop	ND	ND	ND
MCPA	ND	ND	ND
MCPP	ND	4400	2700
Pentachlorophenol	1.8	3.9	2.7
Metals (mg/kg)			
Aluminum, Total	28	100	80
Antimony	0.16	ND	ND
Arsenic, Total	ND	1.2	1.1
Barium, Total	ND	ND	ND
Cadmium, Total	ND	ND	ND
Chromium, Total	0.23	0.28	0.27
Copper, Total	8.3	16	12
iron	ND	ND	ND
Lead, Total	0.39	0.61	0.50
Manganese	ND	ND	ND
Mercury	ND	ND	ND
Molybdenum	ND	ND	ND
Nickel, Total	ND	ND	ND
Selenium	ND	0.61	0.54
Silver	0.090	0.062	0.06
Zinc, Total	16	17 ND	16
Total PCBs (ug/kg)	ND	ND	ND
Pesticides (ug/kg) 4,4'-DDD	ND	ND	ND
	ND ND	ND ND	ND ND
4,4'-DDE 4,4'-DDT	ND ND	ND ND	ND ND
Aldrin	ND ND	ND ND	ND ND
Alpha Chlordane	ND ND	ND	ND
delta-BHC	ND ND	ND	ND
Dieldrin	ND ND	ND	ND ND
Endosulfan I	ND ND	ND	ND
Endosulfan II	ND	ND	ND
Endosulfan sulfate	ND ND	ND	ND
Endrin aldehyde	ND	ND	ND
Endrin ketone	ND ND	ND	ND
Gamma Chlordane	ND	ND	ND
gamma-BHC (Lindane)	ND	ND	ND
Heptachlor	ND	ND	ND
Heptachlor epoxide	ND	ND	ND
Methoxychlor	ND	ND	ND
SVOC (ug/kg)			
bis(2-ethylhexyl)phthalate	ND	98	95
Di-n-butylphthalate	ND	ND	ND
Diethylphthalate	44	59	58
Acenaphthylene	ND	ND	ND
Fluoranthene	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND
Indeno(1,2,3-c-d)pyrene	ND	ND	ND
Dibenz(a,h)anthracene	ND	ND	ND
2,3,7,8-TCDD TEQ Mammal	0.000218	9.61E-05	6.44E-05
2,3,7,8-TCDD TEQ Bird	0.00172	7.45E-05	4.86E-05

Table 7-24
Clam Concentrations in the Borrow Pit Lake and both Reference Areas
Sauget Area I

	Site	Site	Reference	Reference
Compound	Maximum	Average	Maximum	Average
Herbicides (ug/kg)		- CARLETTE		
2.4-D	ND	ND	ND	ND
2.4-08	NED	ND	ND I	ND
Dicamba	ND	ND	ND	ND
Dichloroprop	32	18	87	35
MCPA	ND	ND	1400	7467
MCPP	4000	5000	ND	ND
Pentachlorophenol	ND	ND	ND	ND
Metals (mg/kg)		· · · · · · · · · · · · · · · · · · ·		
Aluminum, Total	13	10.5	26	18.33
Antimony	ND	ND	ND	ND
Arsenic, Total	0.96	1.8	0.65	1.75
Barium, Total	ND	ND	ND	ND
Cadmium, Total	0.12	0.14	0.61	0.43
Chromium, Total	1.1	0.68	2.2	1.50
Copper, Total	0.99	0.86	2.4	2.13
Iron	ND	ND	ND	ND
Lead, Total	0.25	0.23	0.59	0.42
Manganese	ND	ND	ND	ND
Mercury	ND	ND	ND	ND
Molybdenum	ND	ND	ND	ND
Nickel, Total	ND :	ND	ND	ND
Selenium	ND	ND	0.48	0.31
Silver	0.015	0.035	ND	ND 00
Zinc, Total	22	15.0	52	36
Total PCBs (ug/kg)	ND	ND	ND	ND
Pesticides (ug/kg)				I
[4,4'-000 	ND I	ND	ND	ND
4,4'-DDE	ND 1	ND	ND	ND
4,4'-00T	ND S	ND	ND 15	ND
Aldrin Alaba Chlastana	NO 24	ND ND	ND ND	ND ND
Alpha Chlordane	ND S	ND ND	ND ND	ND ND
delta-BHC Dieldrin	ND ND	ND ND	ND ND	ND ND
Uleionin Endosulfan i	NO NO	ND I	ND ND	<b>100</b>
Endosulian II	<b>20</b>	ND ND	ND ND	ND ND
Endosulfan sulfate	ND ND	ND ND	ND ND	ND I
Endrin aldehyde	ND ND	ND	ND ND	ND ND
Endrin kelone	ND ND	ND	ND	ND
Gamma Chlordane	NO I	ND	ND	ND ND
gamma-BHC (Lindane)	ND ND	ND	ND ND	ND
Heotachlor	2.3	3.55	ND	NED
Heptachlor epoxide	ND ND	ND ND	ND	ND
Afethoxychlor	5.4	30	ND	ND
SVOC (ug/kg)	<del></del>			
bis(2-ethylhexyl)phthalate	170	99	ND	ND
Di-n-butylphthalate	ND	ND	ND	NO
Diethylphthalate	120	75	ND	ND
Acenaphthylene	ND I	ND	ND	ND
Fluoranthene	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND
Indeno(1,2,3-c-d)pyrene	ND	ND	ND	ND
Dibenz(a,h)anthracene	ND	ND	ND	ND
2,3,7,8-TCDD TEQ Marmmal	0.000146	8.3E-05	3.64E-05	2.44E-05
2,3,7,8-TCDD TEQ Bird	0.001303	0.000761	0.00025	0.00017

Table 7-25

Comparison of Floodplain Surface Soil Concentrations to Ecological Benchmarks

Sauget Area I

Constituent	Frequency of Detection in Soil	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Dioxins, ug/kg							
2,3,7,8-TCDD TEQ (mammals) <sup>2</sup>	100%	0.052	0.011	yes	0.124	0.00315	Maximum exceeds benchmark
Herbicides, ug/kg							
2,4-D	2%	9.60	NC	no	ND		Frequency less than 5%
2,4-DB	6%	41.00	6.62	yes	ND		No benchmark; ND in background
Dicamba	23%	23.00	4.90	yes	ND		No benchmark; ND in background
MCPA	20%	7400	1784	yes	14500		No benchmark; within background
MCPP	15%	7700	1859	yes	9967		No benchmark; within background
Metals, mg/kg							
Aluminum	100%	18000	10122	yes	25400		No benchmark; within background
Antimony	42%	2.60	1.24	yes	3.80	5	Maximum less than benchmark
Arsenic	100%	34.00	7.88	yes	19.13	9.9	Maximum exceeds benchmark
Barium	100%	1200	198	yes	363	283	Maximum exceeds benchmark
Beryllium	85%	1.10	0.62	yes	1,51	10	Maximum less than benchmark
Cadmium	100%	8.40	2.77	yes	8.65	4	Maximum exceeds benchmark
Calcium	100%	250000	30365	yes	33533		Low toxicity
Chromium	100%	49.00	17.93	yes	39		No benchmark; within background
Cobalt	100%	11.00	7.01	yes	16	20	Maximum less than benchmark
Copper	100%	230	80.94	yes	209	60	Maximum exceeds benchmark
Iron	100%	25000	16348	yes	38000	00	No benchmark; within background
Lead	100%	260	78.92	yes	185	40.5	Maximum exceeds benchmark
Magnesium	100%	21000	6448	yes	17233	40.5	Low toxicity
Manganese	100%	1200	429	yes	883		No benchmark; within background
Mercury	100%	0.57	0.08		0.18		No benchmark; within background
	98%	3.20	0.81	yes	2.02	2	Maximum exceeds benchmark
Molybdenum Nickel	100%	55	20.02	yes	42.67	30	Maximum exceeds benchmark
Potassium	100%	3800	2135	yes	4733	30	Low toxicity
Selenium	25%	3.20	0.66	yes	4733 ND	0.21	Maximum exceeds benchmark
Silver	49%	0.60	0.49	yes	1.35	2	Maximum less than benchmark
	26%		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	yes		1	
Thallium	100%	1.40	0.68	yes	ND	2	Maximum exceeds benchmark
Vanadium		120	29.91	yes	69	8.5	Maximum exceeds benchmark
Zinc	100%	1400	332	yes	808	8.5	Maximum exceeds benchmark
PCBs, ug/kg	000/	005	00.40		1000	074	Mandanana anna ada bara bara ada
Total PCBs	82%	385	90.43	yes	1200	371	Maximum exceeds benchmark
Pesticides, ug/kg	00/	20	2.04	SACRESCO, MERCHANISTS	ND		No because and ND in become
4,4'-DDD	8%	36	3.01	yes	ND		No benchmark; ND in background
4,4'-DDE	54%	54	404	yes	16.12		No benchmark; within background
4,4'-DDT	48%	140	7.95	yes	14.12		No benchmark; within background
Aldrin	2%	23	1.68	yes	ND		Frequency less than 5%
Alpha Chlordane	20%	54	2.55	yes	ND		No benchmark; ND in background
alpha-BHC	2%	0.22	NC	no	ND		Frequency less than 5%
peta-BHC	11%	3.80	0.54	yes	ND		No benchmark; ND in background
delta-BHC	8%	0.24	0.22	yes	ND		No benchmark; ND in background
Dieldrin	29%	120	3.86	yes	ND		No benchmark; ND in background
Endosulfan II	2%	1.00	NC	no	ND		Frequency less than 5%
Endosulfan sulfate	18%	1.90	1.60	yes	ND		No benchmark; ND in background
Endrin	6%	6.10	2.31	yes	ND		No benchmark; ND in background
Endrin aldehyde	5%	5.06	2.16	yes	ND		No benchmark; ND in background
Endrin ketone	37%	4.9450	2.56	yes	ND		No benchmark; ND in background

Table 7-25
Comparison of Floodplain Surface Soil Concentrations to Ecological Benchmarks
Sauget Area I

Constituent	Frequency of Detection in Soil	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Gamma Chlordane	22%	78.00	3.26	yes	ND		No benchmark; ND in background
gamma-BHC (Lindane)	3%	0.1300	NC	no	ND		Frequency less than 5%
Heptachlor	6%	91	1.98	ves	ND		No benchmark; ND in background
Heptachlor epoxide	25%	30	2.04	yes	ND		No benchmark; ND in background
Methoxychlor	37%	38	11.61	yes	ND		No benchmark; ND in background
SVOCs, ug/kg	0,70		11.01	100		CONTRACTOR SCOUNTS	To bolletiman, 115 ili baoligicana
2-Methylnaphthalene	5%	72	NC	no	ND	STRUCK COSTS	No benchmark; ND in background
Acenaphthene	14%	1200	124	yes	ND	20000	Maximum less than benchmark
Acenaphthylene	6%	75	174	no	ND	20000	No benchmark; ND in background
Anthracene	23%	2300	152	yes	160		No benchmark; within background
Benzo(a)anthracene	57%	4300	266	ves	240	OUT THE REAL PROPERTY.	No benchmark; higher than background
	40%	3600	226	THE RESERVE OF THE PARTY OF THE	187		
Benzo(a)pyrene		THE REAL PROPERTY OF THE PARTY	The second second second	yes			No benchmark; higher than background
Benzo(b)fluoranthene	55%	4400	282	yes	179		No benchmark, higher than background
Benzo(g,h,i)perylene	37%	2200	201	yes	127		No benchmark; higher than background
Benzo(k)fluoranthene	40%	3400	249	yes	208		No benchmark; higher than background
bis(2-Ethylhexyl)phthalate	29%	430	111	yes	322	Michael Control Control Control Control	No benchmark; within background
Butylbenzylphthalate	5%	340	103	yes	ND		No benchmark; ND in background
Carbazole	17%	1000	127	yes	64		No benchmark; higher than background
Chrysene	63%	4900	319	yes	273		No benchmark; higher than background
Dibenzo(a,h)anthracene	18%	810	90	yes	ND		No benchmark; ND in background
Dibenzofuran	8%	770	112	yes	ND		No benchmark; ND in background
Diethylphthalate	2%	39	NC	no	187	100000	Frequency less than 5%
Di-n-butylphthalate	15%	170	100	yes	312	200000	Maximum less than benchmark
Fluoranthene	60%	10000	558	yes	502		No benchmark; higher than background
Fluorene	11%	1400	126	yes	ND		No benchmark; ND in background
Indeno(1,2,3-cd)pyrene	28%	2000	195	yes	ND		No benchmark; ND in background
Naphthalene	3%	79	180	no	ND		Frequency less than 5%
Pentachlorophenol	55%	740	278	yes	742	3000	Maximum less than benchmark
Phenanthrene	52%	9200	366	yes	335		No benchmark; higher than background
Pyrene	49%	8500	443	yes	435		No benchmark; higher than background
VOCs, ug/kg						THE RESERVE AND ADDRESS OF THE PARTY OF	
2-Butanone (MEK)	35%	47.00	20.85	yes	ND		No benchmark; ND in background
2-Hexanone	5%	6.90	8.01	no	33.00	BEAUTY ENGINEERING TO THE	No benchmark; within background
Acetone	49%	670	283	yes	ND		No benchmark; ND in background
Benzene	8%	4.80	2.97	yes	ND		No benchmark; ND in background
Carbon disulfide	5%	4.30	2.98	yes	ND		No benchmark; ND in background
Chlorobenzene	2%	4.00	2.95	yes	ND	40000	Frequency less than 5%
Ethylbenzene	2%	3.00	2.78	yes	ND	40000	Frequency less than 5%
Methylene chloride (Dichloromethane)	5%	2.40	2.76		11.4		No benchmark; within background
Toluene	20%	12.0	3.34	yes	ND	200000	
	STATE OF THE PARTY	Charles and the Charles of the Charl	Control Company of the Control	yes		200000	Maximum less than benchmark
Trichloroethene	6%	6.20	3.07	yes	ND		No benchmark; ND in background
Xylenes, Total	2%	4.20	2.99	yes	ND		Frequency less than 5%

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil).

<sup>&</sup>lt;sup>2</sup>Calculated according to 1998 World Health Organization guidelines for mammals; Estimated Maximum Potential Concentration treated as non-detects.

#### Table 7-26 Floodplain Surface Soil Locations that Exceed Ecological Benchmarks Sauget Area I

Constituent	Sample ID	Concentration	ER Q
Arsenic, mg/kg	Benchmark <sup>1</sup>	9.9	
	Background <sup>2</sup>	19	
	DAS-T4-S2-0-0.5FT	10	1
	UAS-T1-S1-0-0.5FT	10	
	UAS-T2-S3-0-0.5FT	10	
D i	UAS-T7-S1-0-0.5FT Benchmark <sup>1</sup>	34	
Barium, mg/kg		283	
	Background <sup>2</sup> UAS-T4-S2-0-0.5FT	360 <b>1200</b>	
Cadmium, mg/kg	Benchmark <sup>1</sup>	4	
	Background <sup>2</sup>	8.6	
	DAS-T5-S3-0-0.5FT	5.7	
	DAS-T6-S1-0-0.5FT	4	ĺ
	UAS-T1-S1-0-0.5FT	4.8	
	UAS-T5-S6-0-0.5FT	8.4	
	UAS-T7-S1-0-0.5FT UAS-T7-S7-0-0.5FT	5.4 6.1	
Copper, mg/kg	Benchmark <sup>1</sup>	60	
,, , , , ,	Background <sup>2</sup>	190	
	DAS-T1-S1-0-0.5FT	98	J
	DAS-T1-S2-0-0.5FT	85	J
	DAS-T1-S3-0-0.5FT	73	J
	DAS-T2-S1-0-0.5FT	110	J
	DAS-T2-S3-0-0.5FT	94 70	J
	DAS-T3-S1-0-0.5FT   DAS-T3-S2-0-0.5FT	70 72	
	DAS-T3-S3-0-0.5FT	63	
	DAS-T4-S2-0-0.5FT	79	
	DAS-T4-S3-0-0.5FT	64	
	DAS-T5-S1-0-0.5FT	75	
	DAS-T5-S3-0-0.5FT	70	
	UAS-T1-S1-0-0.5FT   UAS-T1-S2-0-0.5FT	150 <b>230</b>	
	UAS-T1-S3-0-0.5FT	230	
	UAS-T1-S4-0-0.5FT	160	
	UAS-T1-S5-0-0.5FT	130	
	UAS-T1-S6-0-0.5FT	86	
	UAS-T1-S7-0-0.5FT	77	
	UAS-T2-S1-0-0.5FT	140	.
	UAS-T2-S2-0-0.5FT   UAS-T2-S3-0-0.5FT	77 87	
	UAS-T2-S4-0-0.5FT	95	
	UAS-T2-S5-0-0.5FT	69	1
	UAS-T2-S6-0-0.5FT	87	
	UAS-T3-S2-0-0.5FT	65	
	UAS-T3-S3-0-0.5FT	52	J
	UAS-T3-S4-0-0.5FT UAS-T3-S5-0-0.5FT	77 79	
	UAS-T3-S5-0-0.5FT	79 75	
	UAS-T4-S1-0-0.5FT	69	
	UAS-T4-S2-0-0.5FT	180	
	UAS-T4-S7-0-0.5FT	60	
	UAS-T5-S6-0-0.5FT	85	
	UAS-T7-S1-0-0.5FT	130	

Table 7-26 Floodplain Surface Soil Locations that Exceed Ecological Benchmarks Sauget Area I

Constituent	Sample ID	Concentration	ER Q
Lead, mg/kg	Benchmark <sup>1</sup>	40.5	
1	Background <sup>2</sup>	180	
	DAS-T1-S1-0-0.5FT	96	J
1	DAS-T1-S2-0-0.5FT	50	J
	DAS-T1-S3-0-0.5FT	50	J
ļ	DAS-T2-S1-0-0.5FT	88	J
	DAS-T2-S3-0-0.5FT	76 53	J
	DAS-T3-S1-0-0.5FT DAS-T3-S2-0-0.5FT	90	J
	DAS-T3-S3-0-0.5FT	53	Ĵ
ĺ	DAS-T4-S1-0-0.5FT	75	J
	DAS-T4-S2-0-0.5FT	96	J
	DAS-T4-S3-0-0.5FT	50	J
	DAS-T5-S1-0-0.5FT	130	J
	DAS-T5-S3-0-0.5FT	130	J
	DAS-T6-S1-0-0.5FT DAS-T6-S3-0-0.5FT	110 87	J
	DAS-T0-53-0-0.5FT	67	J
	UAS-T1-S1-0-0.5FT	93	
	UAS-T1-S2-0-0.5FT	92	1
	UAS-T1-S3-0-0.5FT	120	
	UAS-T1-S4-0-0.5FT	73	
1	UAS-T1-S5-0-0.5FT	69	
	UAS-T1-S7-0-0.5FT	46	
	UAS-T2-S1-0-0.5FT	79 50	
	UAS-T2-S2-0-0.5FT   UAS-T2-S3-0-0.5FT	50 66	
	UAS-T2-S4-0-0.5FT	72	<del> </del>
	UAS-T2-S5-0-0.5FT	48	
	UAS-T2-S6-0-0.5FT	79	
	UAS-T3-S2-0-0.5FT	63	
	UAS-T3-S4-0-0.5FT	64	
	UAS-T3-S5-0-0.5FT	56	
	UAS-T3-S7-0-0.5FT	51 62	J
	UAS-T4-S1-0-0.5FT UAS-T4-S2-0-0.5FT	190	
	UAS-T4-S5-0-0.5FT	83	
	UAS-T4-S6-0-0.5FT	130	
	UAS-T4-S7-0-0.5FT	260	
	UAS-T5-S1-0-0.5FT	59	
	UAS-T5-S2-0-0.5FT	50	
	UAS-T5-S3-0-0.5FT	54 50	
	UAS-T5-S4-0-0.5FT UAS-T5-S5-0-0.5FT	50 <b>4</b> 5	
	UAS-T5-S6-0-0.5FT	170	
	UAS-T6-S5-0-0.5FT	78	J
	UAS-T7-S1-0-0.5FT	71	J
	UAS-T7-S2-0-0.5FT	41	[J
	UAS-T7-S3-0-0.5FT	64	J
	UAS-T7-S5-0-0.5FT	42	Į,
	UAS-T7-S6-0-0.5FT UAS-T7-S7-0-0.5FT	<b>72</b> <b>1</b> 50	J
Molybdenum, mg/kg	Benchmark <sup>1</sup>	2	
,,	Background <sup>2</sup>	2	
	UAS-T4-S5-0-0.5FT	2.3	
	UAS-T6-S5-0-0.5FT	3.2	
Nickel, mg/kg	Benchmark <sup>1</sup>	30	
	Background <sup>2</sup>	43	
	UAS-T7-S1-0-0.5FT	55	<u> </u>

Table 7-26 Floodplain Surface Soil Locations that Exceed Ecological Benchmarks Sauget Area I

Constituent	Sample ID	Concentration	ER Q
Selenium, mg/kg	Benchmark <sup>1</sup>	0.21	
	Background <sup>2</sup>	ND	1
	DAS-T2-S3-0-0.5FT	0.55	J
	DAS-T4-S2-0-0.5FT	0.88	J
	UAS-T1-S1-0-0.5FT	0.81	J
	UAS-T1-S5-0-0.5FT	0.72	J
	UAS-T2-S4-0-0,5FT	0.61	J
	UAS-T2-S6-0-0.5FT	1	J
	UAS-T3-S5-0-0.5FT	0.6	J
	UAS-T3-S7-0-0.5FT	3.2	
	UAS-T5-S4-0-0.5FT	0.48	J
	UAS-T6-S5-0-0.5FT	0.68	J
	UAS-T7-S1-0-0.5FT	1.1	
	UAS-T7-S2-0-0.5FT	0.49	J
	UAS-T7-S3-0-0.5FT	0.89	J
	UAS-T7-S4-0-0.5FT	0.55	J
	UAS-T7-S6-0-0.5FT	1.1	
	UAS-T7-S7-0-0.5FT	0.53	J
Thallium, mg/kg	Benchmark <sup>1</sup>	1	
	Background <sup>2</sup>	ND	
	DAS-T2-S2-0-0.5FT	1.3	
	DAS-T3-S2-0-0.5FT	1.4	
	DAS-T4-S2-0-0.5FT	. 1.1	J
	DAS-T4-S3-0-0.5FT	1.1	J _

Constituent	Sample ID	Concentration	ER (
/anadium, mg/kg	Benchmark <sup>1</sup>	2	
	Background <sup>2</sup>	69	
	DAS-T1-S1-0-0.5FT	19	}
	DAS-T1-S2-0-0.5FT	25	
	DAS-T1-S3-0-0.5FT	18	
	DAS-T2-S1-0-0.5FT	24	
	DAS-T2-S2-0-0.5FT	120	
	DAS-T2-S3-0-0.5FT DAS-T3-S1-0-0.5FT	34 23	
	DAS-T3-S1-0-0.5FT	25 25	}
	DAS-T3-S2-0-0.5FT	20	
	DAS-T4-S1-0-0.5FT	21	
	DAS-T4-S2-0-0.5FT	35	
	DAS-T4-S3-0-0.5FT	34	J
	DAS-T5-S1-0-0.5FT	19	
	DAS-T5-S2-0-0.5FT	19	
	DAS-T5-S3-0-0.5FT	17	ļ
	DAS-T6-S1-0-0.5FT	22	IJ
	DAS-T6-S2-0-0.5FT DAS-T6-S3-0-0.5FT	22 17	)J  J
	DAS-T6-S3-U-0.5FT	17 25	٦
	DAS-T7-S2-0-0.5FT	22	
	UAS-T1-S1-0-0.5FT	32	
	UAS-T1-S2-0-0.5FT	35	
	UAS-T1-S3-0-0.5FT	41	
	UAS-T1-S4-0-0.5FT	36	
	UAS-T1-S5-0-0.5FT	35	
	UAS-T1-S6-0-0.5FT	22	
	UAS-T1-S7-0-0.5FT	21	-
	UAS-T2-S1-0-0.5FT UAS-T2-S2-0-0.5FT	30 28	}
	UAS-T2-S3-0-0.5FT	40	J
	UAS-T2-S4-0-0.5FT	46	
	UAS-T2-S5-0-0.5FT	30	J
	UAS-T2-S6-0-0.5FT	28	J
	UAS-T3-S1-0-0.5FT	30	
	UAS-T3-S2-0-0.5FT	39	J
	UAS-T3-S3-0-0.5FT	26	J
	UAS-T3-S4-0-0.5FT	42	J
	UAS-T3-S5-0-0.5FT	27	J
	UAS-T3-S6-0-0.5FT UAS-T3-S7-0-0.5FT	23 13	J
	UAS-T4-S1-0-0.5FT	13 23	
	UAS-T4-S2-0-0.5FT	22	İ
	UAS-T4-S3-0-0.5FT	27	İ
	UAS-T4-S4-0-0.5FT	15	
	UAS-T4-S5-0-0.5FT	26	
	UAS-T4-S6-0-0.5FT	29	į
	UAS-T4-S7-0-0.5FT	26	
	UAS-T5-S1-0-0.5FT	29	
	UAS-T5-S2-0-0.5FT	29	-
	UAS-T5-S3-0-0.5FT UAS-T5-S4-0-0.5FT	25 26	-
	UAS-T5-S5-0-0.5FT	28	
	UAS-T5-S6-0-0.5FT	27	1
	UAS-T6-S1-0-0.5FT	25	
	UAS-T6-S2-0-0.5FT	24	
	UAS-T6-S3-0-0.5FT	30	
	UAS-T6-S4-0-0.5FT	33	
	UAS-T6-S5-0-0.5FT	30	
	UAS-T7-S1-0-0.5FT	27	
	UAS-T7-S2-0-0.5FT	25	
	UAS-T7-S3-0-0.5FT	33	
	UAS-T7-S4-0-0.5FT	22	1
	UAS-T7-S5-0-0.5FT UAS-T7-S6-0-0.5FT	26 22	
	UAS-T7-S7-0-0.5FT	21	

Constituent	Sample ID	Concentration	ER Q
Zinc, mg/kg	Benchmark <sup>1</sup>	8.5	
	Background <sup>2</sup>	810	
	DAS-T1-S1-0-0.5FT	300	J
	DAS-T1-S2-0-0.5FT	230	J
	DAS-T1-S3-0-0.5FT	250	J
	DAS-T2-S1-0-0.5FT	290	J
	DAS-T2-S2-0-0.5FT DAS-T2-S3-0-0.5FT	140 260	J
	DAS-T3-S1-0-0.5FT	220	Ĵ
	DAS-T3-S2-0-0.5FT	240	Ĵ
	DAS-T3-S3-0-0.5FT	260	J
	DAS-T4-S1-0-0.5FT	240	J
	DAS-T4-S2-0-0.5FT	310	
	DAS-T4-S3-0-0.5FT	180	١.
	DAS-T5-S1-0-0.5FT	330	J
	DAS-T5-S2-0-0.5FT DAS-T5-S3-0-0.5FT	140 750	J
	DAS-T6-S1-0-0.5FT	350	J
	DAS-T6-S2-0-0.5FT	110	1
	DAS-T6-S3-0-0.5FT	240	}
	DAS-T7-S1-0-0.5FT	870	
	DAS-T7-S2-0-0.5FT	260	
	UAS-T1-S1-0-0.5FT	1400	IJ
	UAS-T1-S2-0-0.5FT	340	. J
	UAS-T1-S3-0-0.5FT	390	J
	UAS-T1-S4-0-0.5FT  UAS-T1-S5-0-0.5FT	280 270	J
	UAS-T1-S6-0-0.5FT	180	J
	UAS-T1-S7-0-0.5FT	250	J
	UAS-T2-S1-0-0.5FT	310	J
	UAS-T2-S2-0-0.5FT	190	J
	UAS-T2-S3-0-0.5FT	250	J
	UAS-T2-S4-0-0.5FT	270	J
	UAS-T2-S5-0-0.5FT	210	ال
	UAS-T2-S6-0-0.5FT	290 160	J
	UAS-T3-S1-0-0.5FT UAS-T3-S2-0-0.5FT	160 240	
	UAS-T3-S3-0-0.5FT	160	J
	UAS-T3-S4-0-0.5FT	300	
	UAS-T3-S5-0-0.5FT	410	
	UAS-T3-S6-0-0.5FT	250	
	UAS-T3-S7-0-0.5FT	460	
	UAS-T4-S1-0-0.5FT	240	
	UAS-T4-S2-0-0.5FT	290	
	UAS-T4-S3-0-0.5FT	76	
	UAS-T4-S4-0-0.5FT	82 120	
	UAS-T4-S5-0-0.5FT UAS-T4-S6-0-0.5FT	120 140	1
	UAS-T4-S7-0-0.5FT	550	
	UAS-T5-S1-0-0.5FT	230	
	UAS-T5-S2-0-0.5FT	230	
	UAS-T5-S3-0-0.5FT	240	
	UAS-T5-S4-0-0.5FT	230	
	UAS-T5-S5-0-0.5FT	240	
	UAS-T5-S6-0-0.5FT	980	
	UAS-T6-S1-0-0.5FT	160	14
	UAS-T6-S2-0-0.5FT UAS-T6-S3-0-0.5FT	82 90	J
	UAS-T6-S4-0-0.5FT	99	J
	UAS-T6-S5-0-0.5FT	120	IJ
	UAS-T7-S1-0-0.5FT	610	Ĭ
	UAS-T7-S2-0-0.5FT	190	
	UAS-T7-S3-0-0.5FT	270	
	UAS-T7-S4-0-0.5FT	150	
	UAS-T7-S5-0-0.5FT	160	
	UAS-T7-S6-0-0.5FT	310	
	UAS-T7-S7-0-0.5FT	640	<u> </u>

### Table 7-26 Floodplain Surface Soil Locations that Exceed Ecological Benchmarks Sauget Area I

Constituent	Sample ID	Concentration	ER Q
Total PCBs, ug/kg	Benchmark <sup>1</sup>	371	
	Background <sup>2</sup>	1200	
	UAS-T6-S2-0-0.5FT	385	
2,3,7,8-TCDD TEQ (mammals)	Benchmark <sup>1</sup>	0.00315	
in ug/kg	Background <sup>2</sup>	0.124	
	DAS-T1-S1-0-0.5FT	0.0235855	
	DAS-T1-S2-0-0.5FT	0.016399	
	DAS-T1-S3-0-0.5FT	0.014051	1
	DAS-T2-S1-0-0.5FT	0.02144	
	DAS-T2-S2-0-0.5FT	0.012195	
	DAS-T2-S3-0-0.5FT	0.017101	
	DAS-T3-S1-0-0.5FT	0.007658	
	DAS-T3-S2-0-0.5FT	0.008586	
	DAS-T3-S3-0-0.5FT	0.00766	
	DAS-T4-S1-0-0.5FT	0.016645	J
	DAS-T4-S2-0-0.5FT	0.006258	
	DAS-T4-S3-0-0.5FT	0.006696	
	DAS-T5-S1-0-0.5FT	0.005006	
	DAS-T5-S2-0-0.5FT	0.005483	
	DAS-T5-S3-0-0.5FT	0.02432	
	DAS-T6-S1-0-0.5FT	0.009106	
	DAS-T6-S2-0-0.5FT	0.004063	
	DAS-T6-S3-0-0.5FT	0.006762	
	DAS-T7-S1-0-0.5FT	0.0034335	
	DAS-T7-S2-0-0.5FT	0.008225	
	UAS-T1-S1-0-0.5FT	0.01856	
	UAS-T1-S6-0-0.5FT	0.015206	
	UAS-T2-S4-0-0.5FT	0.01974	
	UAS-T3-S3-0-0.5FT	0.005056	
	UAS-T4-S1-0-0.5FT	0.008645	
	UAS-T4-S6-0-0.5FT	0.187423	
	UAS-T5-S4-0-0.5FT	0.00562	
	UAS-T6-S3-0-0.5FT	0.01658	
	UAS-T7-S3-0-0.5FT	0.0087385	

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints.

<sup>&</sup>lt;sup>2</sup>Background concentration is twice average concentration for three background soil samples.

Shading indicates concentrations exceeds benchmark and background.

Table 7-27a

Comparison of Site G Surface Soil Concentrations to Ecological Benchmarks
Sauget Area I

Constituent	Frequency of Detection in Soil	Number of Samples for Statistics	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Dioxins, ug/kg			MELT STATE OF					
2,3,7,8-TCDD TEQ (mammals) <sup>2</sup>	100%	4	0.01	1.323	no	0.124	0.00315	Maximum exceeds benchmark
Herbicides, ug/kg			DESCRIPTION OF THE PARTY OF THE		10-4.57			
Metals, mg/kg							17.5	
Aluminum	100%	4	15000,00	15906	no	25400		No benchmark; within background
Antimony	50%	2	0.72	0.91	no	3.80	5	Maximum less than benchmark
Arsenic	100%	4	8.05	8.14	no	19.13	9.9	Maximum less than benchmark
Barium	100%	4	140.00	149	no	363	283	Maximum less than benchmark
Beryllium	100%	4	0.64	0.66	no	1.51	10	Maximum less than benchmark
Cadmium	100%	4	0.39	0.50	no	8.65	4	Maximum less than benchmark
Calcium	100%	4	14000.00	14008	no	33533		No benchmark; within background
Chromium	100%	4	22.00	22.76	no	39		No benchmark; within background
Cobalt	100%	4	8.60	8.69	no	16	20	Maximum less than benchmark
Copper	100%	4	290.00	600.28	no	209	60	Maximum exceeds benchmark
ron	100%	4	20000.00	20489	no	38000		No benchmark; within background
ead	100%	4	16.00	18.28	no	185	40.5	Maximum less than benchmark
Magnesium	100%	4	4950.00	5517	no	17233	40.0	Low toxicity
Manganese	100%	4	740.00	786		883		No benchmark; within background
	100%	4	0.03	0.03	no	0.18		
Mercury		4		0.03	no			No benchmark; within background
Molybdenum	100%	4	0.78		no	2.02	2 30	Maximum less than benchmark
Nickel	100%	4	21.50	21.71	no	42.67	30	Maximum less than benchmark
Potassium	100%	4	1700.00	1870	no	4733		Low toxicity
/anadium	100%	4	40.00	40.87	no	69	2	Maximum exceeds benchmark
Zinc	100%	4	69.50	NC	no	808	8.5	Maximum exceeds benchmark
PCBs, ug/kg								
Total PCBs	50%	4	46.50	778.56	no	1200	371	Maximum less than benchmark
Pesticides, ug/kg							LATER THE	NO STATE OF THE ST
1,4'-DDT	75%	3	0.16	0.33	no	14.12		No benchmark; within background
Alpha Chlordane	50%	2	0.26	0.63	no	ND		No benchmark; ND in background
lelta-BHC	75%	3	0.18	3.40	no	ND		No benchmark; ND in background
Dieldrin	25%	1	0.06	NC	no	ND		No benchmark; ND in background
Endosulfan I	25%	1	0.22	NC	no	ND		No benchmark; ND in background
Endosulfan II	25%	1	0.34	NC	no	ND		No benchmark; ND in background
Endosulfan sulfate	50%	2	0.18	0.34	no	ND		No benchmark; ND in background
Endrin	50%	2	0.16	0.19	no	ND		No benchmark; ND in background
ndrin aldehyde	50%	2	0.67	NC	no	ND		No benchmark; ND in background
ndrin ketone	50%	2	1.03	1.67	no	ND		No benchmark; ND in background
Samma Chlordane	75%	3	0.31	0.40	no	ND		No benchmark; ND in background
leptachlor epoxide	25%	1	0.22	NC		ND		No benchmark; ND in background
Methoxychlor	25%	1	0.94	NC		ND		No benchmark; ND in background
SVOCs, ug/kg		100100000000000000000000000000000000000				HALLE THE PARTY OF		I mount of the
OCs, ug/kg								

ND = Not detected

only compounds detected at least once are listed in this table

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil).

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

<sup>&</sup>lt;sup>2</sup>Calculated according to 1998 World Health Organization guidelines for mammals; Estimated Maximum Potential Concentration treated as non-detects.

Table 7-27b

Comparison of Site H Surface Soil Concentrations to Ecological Benchmarks
Sauget Area I

Constituent	Frequency of Detection in Soil	Number of Samples for Statistics	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Dioxins, ug/kg								Comment
2,3,7,8-TCDD TEQ (mammals) <sup>2</sup>	100%	4	1.291	177220.313	no	0.124	0.00315	Maximum exceeds benchmark
Herbicides, ug/kg	10070	-	1.201	117220.010		0.124	0.00010	Manifian exceeds benefitary
2,4-DB	50%	4	9.70	9.94	no	ND	MATERIAL PROPERTY AND ADDRESS OF THE PARTY O	No benchmark; ND in background
Metals, mg/kg	0070	DATE OF THE PARTY OF	5.70	0.34		NU		140 benefitian, 145 in baoigiouna
Aluminum	100%	4	14000	39230	no	25400		No benchmark; within background
Antimony	100%	4	2.30	2.37		3.80	5	
Arsenic	100%	4	64.00	7216.39	no	19.13	9.9	Maximum less than benchmark  Maximum exceeds benchmark
Barium	100%	4	120	124	no		283	Maximum less than benchmark
Beryllium	100%	4	3.80		no	363 1.51		
•	100000			46.91	no		10	Maximum less than benchmark
Cadmium	100%	4	22.00	2166.24	no	8.65	4	Maximum exceeds benchmark
Calcium	100%	4	42000	1071222	no	33533		Low toxicity
Chromium	100%	4	23.00	23.40	no	39	The state of the state of	No benchmark; within background
Cobalt	100%	4	20.00	86.11	no	16	20	Maximum equal to benchmark
Copper	100%	4	480	532.72	ho	209	60	Maximum exceeds benchmark
ron	100%	4	18000	18260	no	38000		No benchmark; within background
.ead	100%	4	230	243.58	no	185	40.5	Maximum exceeds benchmark
Magnesium	100%	4	2500	3069	no	17233		No benchmark; within background
Manganese	100%	4	720	739	no	883		No benchmark; within background
Mercury	100%	4	0.77	142.37	no	0.18		No benchmark; exceeds background
Molybdenum	100%	4	11.00	981.99	no	2.02	2	Maximum exceeds benchmark
Vickel	100%	4	70	215,29	no	42.67	30	Maximum exceeds benchmark
Potassium	100%	4	1600	1890	no	4733		Low toxicity
Selenium	75%	4	4.70	941.90	no	ND	0.21	Maximum exceeds benchmark
Sodium	100%	4	390.00	395.84	no	ND		Low toxicity
Silver	75%	4	2.70	2.64	yes	1.35	2	Maximum exceeds benchmark
'hallium	25%	4	2.50	29.97	no	ND	1	Maximum exceeds benchmark
/anadium	100%	4	45	69.01	no	69	2	Maximum exceeds benchmark
linc	100%	4	3600	628746	no	808	8.5	Maximum exceeds benchmark
PCBs, ug/kg	10070		3000	020140	110	000	0.0	With an exceed benefit and
Total PCBs	75%	4	1519	1563.37	no	1200	371	Maximum exceeds benchmark
Pesticides, ug/kg	1070		1010	1000,07	110	1200	071	Washingth exceeds benefitialk
I,4'-DDE	75%	4	86	800339929.23	no	16.12	MINISTREMENTAL PRINTERS	No benchmark; exceeds background
I,4'-DDT	75%	4	110	11675720159.04	no	14.12		No benchmark; exceeds background
Aldrin	50%	4	CONTRACTOR DESCRIPTION OF THE PERSON OF THE					
	25%	3	21	19.44	yes	ND		No benchmark; ND in background
Indosulfan II			7.20	1853.29	no	ND		No benchmark; ND in background
Endrin ketone	75%	4	82.0000	10230171916.44	no	ND		No benchmark; ND in background
Samma Chlordane	50%	4	30.00	33.50	no	ND		No benchmark; ND in background
leptachlor	25%	3	2	8.26	no	ND		No benchmark; ND in background
leptachlor epoxide	75%	4	44	1108116322805.02	no	ND		No benchmark; ND in background
lethoxychlor	50%	4	130	199687.00	no	ND		No benchmark; ND in background
VOCs, ug/kg								
enzo(a)anthracene	75%	4	130	133	no	240		No benchmark; within background
enzo(a)pyrene	75%	4	140	145	no	187		No benchmark; within background
enzo(b)fluoranthene	75%	4	140	154	no	179		No benchmark; within background
enzo(g,h,i)perylene	25%	4	370	2168	no	127		No benchmark; higher than backgrour
enzo(k)fluoranthene	75%	4	130	137	no	208		No benchmark; within background
s(2-Ethylhexyl)phthalate	50%	4	120	126	no	322		No benchmark; within background
hrysene	75%	4	300	734	no	273		No benchmark; higher than backgroun
luoranthene	75%	4	240	250	no	502		No benchmark; within background
ideno(1,2,3-cd)pyrene	50%	4	100	NC	no	ND		No benchmark; ND in background
entachlorophenol	25%	4	241	241	no	742	3000	Maximum less than benchmark
Phenanthrene	25%	4	110	NC	no	335		No benchmark; within background
yrene	75%	4	190	213	no	435		No benchmark; within background
OCs, ug/kg	7570	7	100	210	110	400		Saloimain, walli background

# Table 7-27b Comparison of Site H Surface Soil Concentrations to Ecological Benchmarks Sauget Area I

Constituent	Frequency of Detection in Soil	Number of Samples for Statistics	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
2-Hexanone	25%	1	5.70	NC	no	33.00	HI TO STATE OF THE PARTY OF THE	No benchmark; within background
Carbon disulfide	25%	3	4.30	4.89	no	ND		No benchmark; ND in background
etrachloroethene	25%	4	17.00	297.55	no			No benchmark; ND in background

#### ND = Not detected

only compounds detected at least once are listed in this table

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil).

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

<sup>&</sup>lt;sup>2</sup>Calculated according to 1998 World Health Organization guidelines for mammals; Estimated Maximum Potential Concentration treated as non-detects.

#### Table 7-27c Comparison of Site I Surface Soil Concentrations to Ecological Benchmarks Sauget Area I

Constituent	Frequency of Detection in Soil	Number of Samples for Statistics	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Dioxins, ug/kg 2,3,7,8-TCDD TEQ (mammals) <sup>2</sup>	4000/		40.000	5 000755.40		0.101	0.00245	
	100%	4	12.682	5.82975E+13	no	0.124	0.00315	Maximum exceeds benchmark
Herbicides, ug/kg 2,4-DB	25%	3	29.13	837327.9674	-	ND	STATE OF THE PARTY OF THE	No benchmark; ND in background
letals, mg/kg	23%	3	29.13	03/32/,90/4	no	ND	STATE OF STREET	No bencimark, ND in background
Numinum	100%	4	8000	10373.04485	no	25400		No benchmark; within background
ntimony	100%	4	8.40	27.06307144	no	3.80	5	Maximum exceeds benchmark
rsenic	100%	4	12.00	12.09603333	no	19.13	9.9	Maximum exceeds benchmark
arium	100%	4	740	40737.84503	no	363	283	Maximum exceeds benchmark
eryllium	100%	4	1.70	4.645394701	no	1.51	10	Maximum less than benchmark
admium	100%	4	31.00	45692.89244	no	8.65	4	Maximum exceeds benchmark
alcium	100%	4	235000	480323.5391	no	33533	7	Low toxicity
hromium	100%	4	65.00	557.0784649	no	39	MERCAL PROPERTY AND ADDRESS.	No benchmark; exceeds background
obalt	100%	4	33.00	18037.66354	no	16	20	Maximum exceeds benchmark
opper	100%	4	13000	13393.5185	no	209	60	Maximum exceeds benchmark
on	100%	4	16000	16047.63857	no	38000	00	No benchmark; within background
ead	100%	4	1500	1410.13458	yes	185	40.5	Maximum exceeds benchmark
lagnesium	100%	4	19000	28676.00543	no	17233	40.5	Low toxicity
anganese	100%	4	300	355.9479591	no	883		No benchmark; within background
lercury	100%	4	2.00	5713355.711	no	0.18	COLUMN TO SERVICE STATE OF THE PARTY OF THE	No benchmark; within background  No benchmark; exceeds background
olybdenum	100%	4	8.50	8.966566712	no	2.02	2	Maximum exceeds benchmark
ckel	100%	4	65	446.1117448		42.67	30	Maximum exceeds benchmark
otassium	100%	4	1500	1588.502918	no no	4733	30	Low toxicity
elerium	75%	4	1.60	6.886829613			0.21	
					no	ND		Maximum exceeds benchmark
lver odium	100%	4	19.00 870.00	5711.850233	no	1.35	2	Maximum exceeds benchmark
				885.626716	no	00	2	Low toxicity
anadium	100%	4	26	26.2846367	no	69		Maximum exceeds benchmark
nc	100%	4	2800	43298.37599	no	808	8.5	Maximum exceeds benchmark
CBs, ug/kg	75%		121280	0.77045.00	-	1200	371	Marian as assessed hamphurada
otal PCBs	/2%	4	121280	8.7794E+28	no	1200	3/1	Maximum exceeds benchmark
esticides, ug/kg 4'-DDD	100%	3	200	0.407005.50	-	ND.	AND DESCRIPTION OF THE PARTY OF	No book of ND laborated
4-DDE	100%	3	300	6.18723E+56 1.35573E+32	no no	ND 16.12		No benchmark; ND in background No benchmark; exceeds background
4'-DDT	67%	3	460	3.97531E+32	no			
drin	100%	3	250	2.36762E+38	no	14.12 ND		No benchmark; exceeds background
onn pha Chlordane	33%	3			BURNESS AND RESIDENCE			No benchmark; ND in background
eldrin	100%	3	3	NC CCCTATION	no	ND		No benchmark; ND in background
ndosulfan I	100%	3	200 260.00	6.66751E+25 6.20887E+38	no no	ND		No benchmark; ND in background No benchmark; ND in background
ndosulfan II	100%	3	600.00	3.86916E+35	CONTRACTOR AND ADDRESS OF THE PARTY OF THE P	ND		
ndosulfan sulfate	33%	2	8.80	9.59706229	no	ND		No benchmark; ND in background
ndrin	100%	3	240.00	1.43789E+35	no no	ND		No benchmark; ND in background
ndrin aldehyde	100%	3	1500.00	5.89694E+37	no	ND ND		No benchmark; ND in background No benchmark; ND in background
ndrin ketone	100%	3	700.0000	1.29277E+33	no	ND		No benchmark; ND in background  No benchmark; ND in background
amma Chlordane	100%	3	380.00	1.17964E+24	no	ND ND		No benchmark; ND in background  No benchmark; ND in background
eptachlor	67%	3	69	3.90883E+21	no	ND ND		No benchmark; ND in background
eptachlor epoxide	100%	3	140	3.51219E+28	no	ND		No benchmark, ND in background
ethoxychior	100%	3	3000	1.36839E+33	CONTRACTOR CONTRACTOR	ND		No benchmark; ND in background
/OCs, ug/kg	100%	-	3000	1.300392+33	no	ND	COLUMN TO STREET	INO DELIGINARY, IND IT DECKY OUT
	25%	1	46.00	NO		NID	20000	Maximum loss than banchmad
I-Dichlorobenzene 2.4-Trichlorobenzene	25%	4	46.00 180.00	NC 238.3835621	no no	ND ND	20000 20000	Maximum less than benchmark Maximum less than benchmark
	25%	SECURITY STREET	the state of the s	238.3835621 NC	NAME AND ADDRESS OF THE OWNER, WHEN PERSONS ASSESSED.	the state of the s	20000	
-Dichlorophenol	25%		82.00 160.00	NC NC	no	ND ND		No benchmark; ND in background
atroantine Chloroaniline	50%	1			no	CONTRACTOR OF THE PROPERTY OF THE PARTY OF T		No benchmark; ND in background
		4	18000.00	3.34508E+15	no	ND		No benchmark; ND in background
thracene	50%		730	3367658.288	no	160		No benchmark; higher than background
nzo(a)anthracene	75%	4	2200	136193831.4	no	240		No benchmark; higher than background
nzo(a)pyrene	75%	4	2200	2965105917	no	187		No benchmark; higher than background
nzo(b)fluoranthene	75%	4	2800	406310864.3	no	179		No benchmark; higher than background
nzo(g,h,i)perylene	75%	4	1600	5618456.655	no	127		No benchmark; higher than background
nzo(k)fluoranthene	75%	4	960	1054145.623	no	208		No benchmark; higher than background
(2-Ethylhexyl)phthalate rbazole	25% 25%	1	88 320	NC 1299.336446	no no	322 64	ADMITT AND THE PERSON NAMED IN	No benchmark; within background No benchmark; higher than background

#### Table 7-27c Comparison of Site I Surface Soil Concentrations to Ecological Benchmarks Sauget Area I

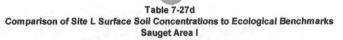
Constituent	Frequency of Detection in Soil	Number of Samples for Statistics	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Chrysene	75%	4	2200	55268524.04	no	273		No benchmark; higher than background
Dibenzo(a,h)anthracene	50%	4	360	44378.40136	no	ND		No benchmark; ND in background
Dibenzofuran	25%	4	100	100.0954465	no	ND		No benchmark; ND in background
Di-n-butylphthalate	25%	1	52	NC	no	312	200000	Maximum less than benchmark
Fluoranthene	100%	4	6000	23187272884	no	502		No benchmark; higher than background
Fluorene	25%	4	230	433.0037693	no	ND		No benchmark; ND in background
Hexachlorobenzene	25%	4	110.00	291.9069705	no	ND		No benchmark; ND in background
Indeno(1,2,3-cd)pyrene	50%	4	1600	7840824.52	no	ND		No benchmark; ND in background
Naphthalene Pentachlorophenol	100%	4	1650	63284.90405	no	ND 742	3000	Maximum less than benchmark
Phenanthrene	100%	4	3300	3.2062E+11	no	335		No benchmark; higher than background
Pyrene	100%	4	4700	1138027755	no	435		No benchmark; higher than background
VOCs, ug/kg Toluene	25%	4	3.3	3,389891562	no	ND	200000	Maximum less than benchmark

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil).

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

<sup>&</sup>lt;sup>2</sup>Calculated according to 1998 World Health Organization guidelines for mammals; Estimated Maximum Potential Concentration treated as non-detects.



		Number of			95% UCL	Twice Average		
Constituent	Frequency of Detection in Soil	Samples for Statistics	Maximum site concentration	95% UCL	Represents Site	Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Dioxins, ug/kg								
2,3,7,8-TCDD TEQ (mammals) <sup>2</sup>	100%	4	0.821	124.7416336	no	0.124	0.00315	Maximum exceeds benchmark
lerbicides, ug/kg			5.0				7	
/letals, mg/kg			1 426					
Numinum	100%	4	7600	7979.493203	no	25400		No benchmark; within background
Intimony	100%	4	5.40	8.850128	no	3.80	5	Maximum exceeds benchmark
rseric	100%	4	37.00	NC	no	19.13	9.9	Maximum exceeds benchmark
Barium	100%	4	250	268.6028182	no	363	283	Maximum less than benchmark
Beryllium	100%	4	1.60	NC	no	1.51	10	Maximum less than benchmark
cadmium	100%	4	10.00	10.23619922	no	8.65	4	Maximum exceeds benchmark
Calcium	100%	4	29000	34213.75505	no	33533		Low toxicity
hromium	100%	4	79.00	448.9603833	no	39	THE RESIDENCE OF THE PARTY OF T	No benchmark; exceeds background
obalt	100%	4	17.00	18.97604255	no	16	20	Maximum less than benchmark
opper	100%	4	4700	74139227.8	no	209	60	Maximum exceeds benchmark
yaride, Total	25%	4	2	36.64438482	no		CANADA SERVICE SERVICE	No benchmark; ND in background
on	100%	4	32000	36106.95214	no	38000	Man and Description of the London Control of	No benchmark; within background
ead	100%	4	940	253773.3978	no	185	40.5	Maximum exceeds benchmark
Magnesium	100%	4	4200	4448.648413	no	17233	40.0	Low toxicity
Manganese	100%	4	650	675.584256	no	883		No benchmark; within background
lercury	100%	4	0.56	0.57447441	no	0.18	SOURCE STATE OF THE PARTY OF TH	No benchmark; exceeds background
Molybdenum	100%	4	23.00	42.61943575	no	2.02	2	Maximum exceeds benchmark
ickel	100%	4					30	
			55	55.78187695	no	42.67	30	Maximum exceeds benchmark
otassium	100%	4	1700	1676.575721	yes	4733	0.04	Low toxicity
elenium	100%	4	4.30	8,99621133	no	ND	0.21	Maximum exceeds benchmark
Iver	75%	4	1.20	1.572152807	no	1.35	2	Maximum less than benchmark
odium	100%	4	540.00	1093.938624	no			Low toxicity
nallium	100%	4	2.10	2.094945789	yes	ND	1	Maximum exceeds benchmark
anadium	100%	4	49	53.02223759	no	69	2	Maximum exceeds benchmark
nc	100%	4	870	860.7747902	yes	808	8.5	Maximum exceeds benchmark
CBs, ug/kg			Control of the last					
otal PCBs	50%	4	1171	1065.507332	yes	1200	371	Maximum exceeds benchmark
esticides, ug/kg								
4'-DDE	75%	4	20	19.74577626	yes	16.12		No benchmark; exceeds background
4'-DDT	25%	4	16	15.77170892	yes	14.12		No benchmark; exceeds background
drin	25%	4	6	6.194243663	no	ND		No benchmark; ND in background
eta-BHC	25%	4	3.70	1356.706081	no	ND		No benchmark; ND in background
eldrin	25%	4	12	12.88917529	no	ND		No benchmark; ND in background
ndrin ketone	75%	4	28.0000	12283.87693	no	ND		No benchmark; ND in background
amma Chlordane	75%	4	21.00	21.34574954	no	ND		No benchmark; ND in background
eptachlor epoxide	75%	4	9	10.51387628	no	ND		No benchmark; ND in background
ethoxychlor	50%	3	46	57.70715929	no	ND		No benchmark; ND in background
VOCs, ug/kg								
Methylnaphthalene	25%	4	140	147.440499	no	ND	SALES TO SELECT A SOUR	No benchmark; ND in background
cenaphthene	50%	4	1600	8491211.257	no	ND	20000	Maximum less than benchmark
nthracene	75%	4	3600	994773566.6	no	160	AND REPORTS OF THE PARTY OF THE	No benchmark; exceeds background
enzo(a)anthracene	75%	4	7800	3.26082E+11	no	240		No benchmark; exceeds background
enzo(a)pyrene	75%	4	7000	3.48435E+13	no	187		No benchmark; exceeds background
enzo(b)fluoranthene	75%	4	6600	70233148182	no	179		No benchmark; exceeds background
enzo(g,h,i)perylene	75%	4	3800	1144351859	no	127		No benchmark; exceeds background
enzo(k)fluoranthene	75%	4	6800	2.1238E+11	no	208		No benchmark; exceeds background
s(2-Ethylhexyl)phthalate	50%	4	310	797.5198398	no	322	STANSON PROPERTY.	No benchmark; within background
rbazole	75%	4	1500	1616221.149	no	64	THE STATE OF THE PARTY OF THE P	No benchmark; exceeds background
rysene	75%	4	7800	3.66513E+11	no	273		No benchmark; exceeds background
rysene benzo(a,h)anthracene	50%	4	1300	584071173.7		ND ND		No benchmark, exceeds background
	CONTROL SHEET STATE OF THE STAT	4	750		no	ND ND		
benzofuran	25%		Charles and Charle	82381.06931	no			No benchmark; ND in background
uoranthene	75%	4	18000	1.57152E+15	no	502		No benchmark; exceeds background
Jorene	50%	4	1400	5221331.358	no	ND		No benchmark; ND in background
deno(1,2,3-cd)pyrene	75%	4	4800	7509937085	no	ND		No benchmark; ND in background
aphthalene	25%	4	320	1222.742364	no	ND	NAME OF THE OWNER, WHEN	No benchmark; ND in background
entachlorophenol	25%	3	240	243.3192197	no	742	3000	Maximum less than benchmark
nenanthrene	75%	4	12000	7.19159E+12	no	335	CHEST PROPERTY OF	No benchmark; exceeds background

#### Table 7-27d Comparison of Site L Surface Soil Concentrations to Ecological Benchmarks Sauget Area I

Constituent	Frequency of Detection in Soil	Number of Samples for Statistics	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Pyrene	75%	4	13000	4.88372E+13	no	435		No benchmark; exceeds background
VOCs, ug/kg Toluene	25%		13.0	62.31309822	no	ND	200000	Maximum less than benchmark

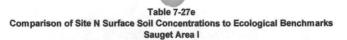
#### ND = Not detected

<sup>1</sup> Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil).

<sup>&</sup>lt;sup>2</sup>Calculated according to 1998 World Health Organization guidelines for mammals; Estimated Maximum Potential Concentration treated as non-detects.



Constituent	Frequency of Detection in Soil	Number of Samples for Statistics	Maximum site concentration	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration	Soil Benchmark <sup>1</sup>	Comment
Dioxins, ug/kg 2,3,7,8-TCDD TEQ (mammals) <sup>2</sup>	100%	4	0.345	29108960.28		0.124	0.00315	Maximum exceeds benchmark
Herbicides, ug/kg	100%	7	0.345	29100900.20	no	0.124	0.00315	Waxiiluii exceeds beliciiliaik
Metals, mg/kg								
Aluminum	100%	4	11000	11367,87884	no	25400		No benchmark; within background
Antimony	25%	1	0.71	NC NC	no	3.80	5	Maximum less than benchmark
Arsenic	100%	4	7.30	7.465249928	no	19.13	9.9	Maximum less than benchmark
Barium	100%	4	1200	1209.136124	no	363	283	Maximum exceeds benchmark
Cadmium	100%	4	1.50	11.80319879	no	8.65	4	Maximum less than benchmark
Calcium	100%	7	109000	1985134.1		33533	,	
Chromium		4			no		a la la la la la la la la la la la la la	Low toxicity
	100%		18.00	22.93479523	no	39	20	No benchmark; within background
Cobalt		4	6.15	NC	no	16	20	Maximum less than benchmark
Copper	100%	4	110	2284.996321	no	209	60	Maximum exceeds benchmark
ron	100%	4	15000	15376.58677	no	38000		No benchmark; within background
Lead	100%	4	410	5632358.094	no	185	40.5	Maximum exceeds benchmark
Magnesium	100%	4	11500	15898.24309	no	17233		Low toxicity
Manganese	100%	4	410	447.4493181	no	883	The State of	No benchmark; within background
Mercury	100%	4	0.10	0.351694441	no	0.18		No benchmark; within background
Molybdenum	100%	4	1.45	1.816470731	no	2.02	2	Maximum less than benchmark
Nickel	100%	4	17	17.12978312	no	42.67	30	Maximum less than benchmark
Potassium	100%	4	1600	1614.831668	no	4733		Low toxicity
Selenium	25%	4	0.68	0.691327842	no	ND	0.21	Maximum exceeds benchmark
Vanadium	100%	4	29	29.3885723	no	69	2	Maximum exceeds benchmark
Zinc	100%	4	250	260.8110532	no	808	8.5	Maximum exceeds benchmark
PCBs, ug/kg Fotal PCBs	25%	4	178	5078256.548	no	1200	371	Maximum less than benchmark
Pesticides, ug/kg 4,4'-DDT	25%	4	3	2 020000427		4440		No handwards within hadron and
		and the same of th	3	2.820036127	no	14.12	AND DESCRIPTION OF THE PARTY OF	No benchmark; within background
Aldrin	25%	3		1.389998414	no	ND		No benchmark; ND in background
Alpha Chlordane	25%	3	1	1.161332487	no	ND		No benchmark; ND in background
peta-BHC	25%	3	0.34	0.382196942	no	ND		No benchmark; ND in background
Dieldrin	25%	3	2	2.328499227	no	ND		No benchmark; ND in background
Gamma Chlordane	25%	4	1.85	3.731761647	no	ND		No benchmark; ND in background
Methoxychlor	25%	4	55	1402.087203	no	ND		No benchmark; ND in background
SVOCs, ug/kg								
Anthracene	75%	3	58	65.54441005	no	160		No benchmark; within background
Benzo(a)anthracene	100%	4	270	277.2454654	no	240		No benchmark; exceeds background
Benzo(a)pyrene	100%	4	330	2741.750887	no	187		No benchmark; exceeds background
Benzo(b)fluoranthene	100%	4	320	3553.567584	no	179		No benchmark; exceeds background
Benzo(g,h,i)perylene	25%	4	300	965.7584844	no	127		No benchmark; exceeds background
Benzo(k)fluoranthene	100%	4	360	370.1287912	no	208		No benchmark; exceeds background
is(2-Ethylhexyl)phthalate	25%	4	130	133.305617	no	322		No benchmark; within background
Chrysene	100%	4	310	1427.615009	no	273		No benchmark; exceeds background
Dibenzo(a,h)anthracene	50%	4	110	106.7183083	yes	ND		No benchmark; ND in background
luoranthene	100%	4	610	626.730565	no	502		No benchmark; exceeds background
ndeno(1,2,3-cd)pyrene	75%	4	250	569.6321335	no	ND		No benchmark; ND in background
Pentachlorophenol	100%	4	474	613.1716845	no	742	3000	Maximum less than benchmark
Phenanthrene	100%	4	260	263.4323597	no	335		No benchmark; less than background
Pyrene	100%	4	550	551.3228038	no	435	SPENISTER OF THE PARTY OF THE P	No benchmark; exceeds background
OCs, ug/kg	The same of the sa	THE RESIDENCE OF THE PARTY OF T	PERSONAL PROPERTY.		The second second	CONTRACTOR OF STREET	Budy - Birth Cole and Cole and	The section and advances being out to

#### ND = Not detected

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

<sup>&</sup>lt;sup>2</sup>Calculated according to 1998 World Health Organization guidelines for mammals; Estimated Maximum Potential Concentration treated as non-detects.

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil).

#### Table 7-28 Surface Soil Locations from Sites G, H, I, L, and N that Exceed Ecological Benchmarks Sauget Area I

Constituent	Sample ID	Concentration	ER Q
Antimony	Benchmark	5	
mg/kg	Background <sup>2</sup>	3.8	
	WASTE-I-B2-0-0 5FT	8.4	J
	WASTE-I-B3-0-0 5FT	8.4	J
	WASTE-I-B4-0-0 5FTFD	5.3	J
	WASTE-L-B1-0-0 5FT	5.4	J
Arsenic	Benchmark	9 9	
mg.'kg	Background <sup>2</sup>	19	i
	WASTE-H-B3-0-0.5FT	64	[
	WASTE-H-B4-0-0.5FT	13	
	WASTE-I-B3-0-0.5FT	12	J
	WASTE-L-B1-0-0.5FT	35	
	WASTE-L-B2-0-0.5FT	37	
	WASTE-L-B3-0-0.5FT	30	1
2	WASTE-L-B4-0-0.5FT	31	
Barium	Benchmark <sup>1</sup>	283	
mg/kg	Background <sup>2</sup>	363	
	WASTE-I-B2-0-0.5FT	740	l .
	WASTE-N-B1-0-0 5FT	860	J
Cadmium	WASTE-N-B2-0-0 5FT	1200	<del>                                     </del>
	Benchmark		
mg/kg	Background	8 6 8.7	,
	WASTE-H-B1-0-0 5FT WASTE-H-B4-0-0 5FT	22	J J
	WASTE-I-B2-0-0.5FT	31	J
	WASTE-I-B3-0-0.5FT	9.2	j
	WASTE-L-B1-0-0 5FT	10	j
	WASTE-L-B2-0-0.5FT	4.6	Ĵ
	WASTE-L-B4-0-0 5FT	7.1	J
Cobalt	Benchmark	20	
mg/kg	Background <sup>2</sup>	16	
	WASTE-I-B2-0-0.5FT	33	
Copper	Benchmark 1	60	
mg/kg	Background <sup>2</sup>	209	
	WASTE-G-B1-0-0.5FT	190	J
	WASTE-G-B1-0-0.5FTFD	390	J
	WASTE-G-B2-0-0.5FT	200	J
	WASTE-G-B3-0-0.5FT	140	J
	WASTE-G-B4-0-0.5FT	100	J
	WASTE-H-B1-0-0.5FT	480	
	WASTE-H-B2-0-0.5FT	200	
	WASTE-H-B3-0-0 5FT	340 480	
	WASTE-H-B4-0-0 5FT WASTE-I-B1-0-0.5FT	2000	J
	WASTE-I-B1-0-0.5F1	10000	J
	WASTE-I-B2-0-0 5FT	13000	J
	WASTE-I-B4-0-0 5FT	1200	J
	WASTE-I-B4-0-0 5FTFD	2100	J
	WASTE-L-B1-0-0.5FT	1700	_
	WASTE-L-B2-0-0.5FT	4700	
	WASTE-L-B3-0-0.5FT	190	
	WASTE-L-B4-0-0.5FT	460	
	WASTE-N-B2-0-0 5FT	110	J

Constituent	Sample ID	Concentration	ER Q
Lead	Benchmark <sup>1</sup>	41	
mg/kg	Background <sup>2</sup>	185	
	WASTE-H-B1-0-0.5FT	200	J
1	WASTE-H-B2-0-0.5FT	53	J
ĺ	WASTE-H-B3-0-0.5FT	100	J
	WASTE-H-B4-0-0 5FT WASTE-I-B1-0-0.5FT	230 220	J
	WASTE-I-B1-0-0.5FT	1500	J
	WASTE-I-B3-0-0.5FT	830	J
	WASTE-I-B4-0-0 5FT	190	J
	WASTE-I-B4-0-0 5FTFD	270	J
	WASTE-L-B1-0-0.5FT	940	J
1	WASTE-L-B2-0-0.5FT WASTE-L-B3-0-0.5FT	<b>190</b> 64	J
ļ	WASTE-L-B4-0-0.5FT	280	J
	WASTE-N-B1-0-0.5FT	410	Ĵ
	WASTE-N-B2-0-0.5FT	99	J
Molybdenum	Benchmark 1	2	
mg/kg	Background <sup>2</sup>	2.0	
	WASTE-H-B1-0-0 5FT	3.6	J
	WASTE-H-B3-0-0.5FT WASTE-H-B4-0-0 5FT	11 4.2	J J
}	WASTE-I-B1-0-0.5FT	4.2 2.7	J
	WASTE-I-B2-0-0 5FT	7.5	Ĵ
	WASTE-I-B3-0-0.5FT	8.5	Ĵ
	WASTE-I-84-0-0.5FT	3.4	J
	WASTE-I-84-0-0.5FTFD	6.1	J
	WASTE-L-B1-0-0 5FT	16	J
	WASTE-L-B2-0-0.5FT WASTE-L-B3-0-0.5FT	23 9.3	J
	WASTE-L-B4-0-0 5FT	9.6	J
Nickel	Benchmark	30	
mg/kg	Background*	43	
	WASTE-H-B3-0-0 5FT	- 70	
	WASTE-I-B2-0-0.5FT	42	J
	WASTE-I-B3-0-0.5FT	65	J
	WASTE-L-B1-0-0 5FT	51	
	WASTE-L-B2-0-0.5FT WASTE-L-B3-0-0.5FT	<b>43</b> 38	
	WASTE-L-B4-0-0.5FT	55	
Selenium	Benchmark 1	0.21	
mg/kg	Background <sup>2</sup>	ND	
_	WASTE-G-B1-0-0.5FT	1.2	U
	WASTE-G-B1-0-0.5FTFD	1,2	U
	WASTE-G-B2-0-0 5FT	1.2	U
	WASTE-G-B3-0-0.5FT WASTE-G-B4-0-0 5FT	1.1 1.1	U
	WASTE-G-B4-0-0 5FT WASTE-H-B1-0-0.5FT	0.64	J
	WASTE-H-B2-0-0.5FT	1.1	Ü
	WASTE-H-B3-0-0.5FT	4.7	
	WASTE-H-B4-0-0 5FT	0.42	J
	WASTE-I-B1-0-0.5FT	1.1	U
	WASTE-I-B2-0-0.5FT WASTE-I-B3-0-0.5FT	1.6	
	WASTE-I-83-0-0.5FT	1.6 0.44	J
	WASTE-I-B4-0-0.5FTFD	0.83	J
	WASTE-L-B1-0-0.5FT	4.3	
	WASTE-L-B2-0-0.5FT	4	
	WASTE-L-B3-0-0.5FT	1.8	
	WASTE-L-B4-0-0.5FT	2.2	
	WASTE-N-B1-0-0.5FT WASTE-N-B2-0-0.5FT	1.1	U
	WASTE-N-B2-0-0 5FT WASTE-N-B3-0-0 5FT	0.99 1.1	U
	WASTE-N-B3-0-0 5FT	0.61	J
	WASTE-N-B4-0-0 5FTFD	0.75	Ĵ
	=		<u>_</u>

Constituent	Sample ID	Concentration	ER Q
Silver	Benchmark <sup>1</sup>	2	Ì
mg/kg	Background <sup>2</sup>	1.4	i
	WASTE-H-B4-0-0 5FT	2.7	J
	WASTE-I-B1-0-0.5FT	3.1	J
	WASTE-I-B2-0-0.5FT WASTE-I-B3-0-0.5FT	11	J
	WASTE-1-83-0-0.5FT WASTE-1-84-0-0 5FTFD	19 2.2	J
Thallium	Benchmark	1	
mg/kg	Background <sup>2</sup>	ND	1
	WASTE-G-B1-0-0.5FT	1.2	υ
	WASTE-G-B1-0-0.5FTFD	1.2	U
	WASTE-G-B2-0-0 5FT WASTE-G-B3-0-0.5FT	1.2	U
	WASTE-G-B3-0-0.57	1.1	U
	WASTE-H-B2-0-0 5FT	1.1	Ŭ
	WASTE-H-B3-0-0.5FT	2.5	
	WASTE-I-B1-0-0 5FT	1.1	U
	WASTE-L-B1-0-0.5FT	2.1	
	WASTE-L-B2-0-0.5FT	1.9	
	WASTE-L-B3-0-0.5FT	1.6	
	WASTE-L-B4-0-0.5FT WASTE-N-B1-0-0.5FT	1.8 1.1	U
	WASTE-N-B1-0-0.5FT	1.1	U
Vanadium	Benchmark <sup>1</sup>	2	
mg/kg	Background <sup>2</sup>	69	
· ·	WASTE-G-B1-0-0.5FT	39	J
	WASTE-G-B1-0-0.5FTFD	39	J
	WASTE-G-B2-0-0.5FT	40	J
	WASTE-G-B3-0-0.5FT	32	J
	WASTE-G-B4-0-0 5FT WASTE-H-B1-0-0 5FT	32 20	J
	WASTE-H-B2-0-0.5FT	33	
	WASTE-H-B3-0-0.5FT	45	
	WASTE-H-B4-0-0.5FT	22	
	WASTE-I-B1-0-0 5FT	17	J
	WASTE-I-B2-0-0.5FT	21	J
	WASTE-I-B3-0-0 5FT	26	J
	WASTE-I-B4-0-0.5FT WASTE-I-B4-0-0.5FTFD	9 <b>4</b> 12	J J
	WASTE-L-B1-0-0.5FT	49	J
	WASTE-L-B2-0-0.5FT	40	
	WASTE-L-B3-0-0.5FT	39	
	WASTE-L-B4-0-0.5FT	49	
	WASTE-N-B1-0-0 5FT	21	
	WASTE-N-B2-0-0.5FT	23	
	WASTE-N-B3-0-0.5FT	22	
	WASTE-N-B4-0-0 5FT	27	
inc	WASTE-N-B4-0-0.5FTFD  Benchmark	8.5	
ng/kg	Background <sup>2</sup>	8.5 808	
aa	WASTE-G-B1-0-0.5FT	64	J
	WASTE-G-B1-0-0 5FTFD	75	Ĵ
	WASTE-G-B2-0-0 5FT	56	J
	WASTE-G-B3-0-0.5FT	60	J
	WASTE-G-B4-0-0.5FT	58	J
	WASTE-H-B1-0-0.5FT	800	J
	WASTE-H-B2-0-0 5FT WASTE-H-B3-0-0 5FT	350 370	J
	WASTE-H-B3-0-0 5FT	3600	J
	WASTE-I-B1-0-0 5FT	1200	J
	WASTE-1-B2-0-0.5FT	2800	Ĵ
	WASTE-I-B3-0-0.5FT	1300	J
	WASTE-I-B4-0-0 5FT	310	J
	WASTE-1-B4-0-0.5FTFD	500	J
	WASTE-L-B1-0-0.5FT	870	J
	WASTEL B2-0-0.5FT	420	J
	WASTE-L-B3-0-0.5FT WASTE-L-B4-0-0.5FT	160 590	J
	WASTE-L-B4-0-0 5F1 WASTE-N-B1-0-0.5FT	210	J
	WASTE-N-B2-0-0 5FT	250	Ĵ
	WASTE-N-B3-0-0 5FT	62	Ĵ
	WASTE-N-B4-0-0.5FT	71	J
	WASTE-N-B4-0-0 5FTFD	79	J

# Table 7-28 Surface Soil Locations from Sites G, H, I, L, and N that Exceed Ecological Benchmarks Sauget Area I

Constituent	Sample ID	Concentration	ER Q
1998 Total TEQ w/ EMPC as ND2	Benchmark <sup>1</sup>	0 0032	
ug/kg	Background <sup>2</sup>	0 12	
	WASTE-G-B1-0-0.5FT	0.071312	
	WASTE-G-B1-0-0.5FTFD	0 063519	
	WASTE-G-B2-0-0.5FT	0.07705	
	WASTE-G-B3-0-0.5FT	0 075513	
	WASTE-G-B4-0-0.5FT	0.0821635	
	WASTE-H-B1-0-0 5FT	0.51835	
	WASTE-H-B2-0-0.5FT	0.28994	
	WASTE-H-B3-0-0 5FT	0 035028	
	WASTE-H-B4-0-0 5FT	1.29117	
	WASTE-I-B1-0-0.5FT	0.0952	
	WASTE-I-B2-0-0 5FT	12.842	
	WASTE-I-B3-0-0 5FT	0.53721	
	WASTE-I-B4-0-0 5FT	0.05881	
	WASTE-I-B4-0-0 5FTFD	0 11224	
	WASTE-L-B1-0-0.5FT	0.83681	
	WASTE-L-B2-0-0.5FT	0.42085	
	WASTE-L-B3-0-0.5FT	0 098685	
	WASTE-L-B4-0-0.5FT	0.11702	
	WASTE-N-B1-0-0,5FT	0.39551	
	WASTE-N-B2-0-0 5FT	0.08499	
	WASTE-N-B3-0-0.5FT	0.029154	
	WASTE-N-B4-0-0 5FT	0.068762	
	WASTE-N-B4-0-0,5FTFD	0.047294	
Total PCBs	Benchmark 1	371	
ug/kg	Background <sup>2</sup>	1200	
	WASTE-H-B1-0-0.5FT	1519	
	WASTE-H-B4-0-0.5FT	1097	
	WASTE-I-B2-0-0 5FT	121280	
	WASTE-I-B3-0-0.5FT	3418	
	WASTE-L-B2-0-0 5FT	1171	

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints
<sup>2</sup>Twice average background soit concentration

<sup>3</sup>Calculated according to 1998 World Health Organization guidelines for mammals, Estimated Maximum Potential Concentration treated as non-detects.

Shading indicates concentration exceeds benchmark and background

# Table 7-29a Comparison of Site G Subsurface Soil Concentrations to Ecological Benchmarks Sauget Area I

Constituent (mg/kg)	Number of Samples for Statistics	Maximum (mg/kg)	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration (mg/kg)	Soil Benchmark (mg/kg) <sup>1</sup>	Comment
1,1,2,2-Tetrachloroethane	1	5.81E-01	NC	no	NA		No comparison possible
1,2,4-Trichlorobenzene	4	1.20E+02	2.19E+05	no	NA	20	Maximum exceeds benchmark
1,2-Dichloroethane	1	4.35E-01	NC	no	NA		No comparison possible
1,4-Dichlorobenzene	2	3.56E+00	NC	no	NA	20	Maximum less than benchmark
2,4,6-Trichlorophenol	1	4.95E+01	NC	no	NA	4	Maximum exceeds benchmark
2,4-Dichlorophenol	3	1.41E+02	5.17E+07	no	NA		No comparison possible
2,4-Dinitrophenol	1	1.40E+01	NC	no	NA	20	Maximum less than benchmark
2-Butanone (MEK)	11	1.78E+01	1.08E+01	yes	ND		No benchmark; ND in background
2-Chlorophenol	1	8.76E+00	NC	no	NA		No comparison possible
2-Methylnapthalene	4	3.71E+01	1.04E+02	no	ND		No benchmark; ND in background
2-Methylphenol(o-cresol)	1	3.56E+00	NC	no	NA		No comparison possible
4,4'-DDE	4	1.35E+02	1.85E+08	no	1.61E-02		No benchmark; higher than background
4-Chloroaniline	3	2.31E+02	4.20E+22	no	NA		No comparison possible
4-Methyl-2-pentanone	4	6.00E+00	5.54E+02	no	NA		No comparison possible
Acenaphthene	1	2.67E+00	NC	no	ND	20	Maximum less than benchmark
Acetone	11	1.54E+01	8.44E+00	yes	ND		No benchmark; ND in background
Aluminum	13	1.87E+04	1.08E+04	yes	2.54E+04		No benchmark; within background
Anthracene	1	8.49E+00	NC	no	1.60E-01		No benchmark; higher than background
Arsenic	5	1.11E+01	1.37E+01	no	1.91E+01	9.9	Maximum exceeds benchmark
Barium	13	4.59E+04	4.18E+04	yes	3.63E+02	283	Maximum exceeds benchmark
Benzene	6	4.53E+01	2.88E+01	no	ND		No benchmark; ND in background
Benzyl alcohol	1	6.10E+00	NC	no	NA		No comparison possible
Butyl benzyl phthalate	1	2.33E+01	NC	no	ND		No benchmark, ND in background
Pentachlorophenol(PCP)	5	4.77E+03	3.34E+07	no	7.42E-01	3	Maximum exceeds benchmark
Cadmium	3	1.40E+01	6.65E+04	no	8.65E+00	4	Maximum exceeds benchmark
Calcium	2	1.85E+04	NC	no	3.35E+04		Low toxicity
Chlorobenzene	8	5.38E+02	1.18E+06	no	ND	40	Maximum exceeds benchmark
Chloroform	1	1.16E+01	NC	no	NA	THE RESERVE	No comparison possible
Chromium	13	9.85E+02	2.28E+02	yes	3.93E+01		No benchmark; higher than background
Chrysene	1	2.29E+01	NC	no	2.73E-01		No benchmark; higher than background
Cobalt	6	5.60E+01	5.25E+01	no	1.55E+01	20	Maximum exceeds benchmark
Copper	20	2.22E+03	3.24E+02	yes	2.09E+02	60	Maximum exceeds benchmark
Di-N-butylphthalate	4	1.76E+01	2.10E+11	no	3.12E-01	200	Maximum less than benchmark
Dibenzofuran	2	3.38E+01	1.12E+02	no	ND		No benchmark; ND in background
Diethylphthalate	1	2.29E+01	NC	no	1.87E-01	100	Maximum less than benchmark
Ethylbenzene	6	1.69E+01	7.35E+03	no	ND		No benchmark, ND in background
Fluoranthene	1	6.59E+00	NC	no	5.02E-01		No benchmark, higher than background
Fluorene	1	1.13E+01	NC	no	ND		No benchmark; ND in background
Hexachlorobenzene	2	4.06E+01	NC	no	NA		No comparison possible
ron	22	5.37E+04	1.73E+04	yes	3.80E+04		No benchmark; within background
Lead	18	3.12E+03	7.30E+02	yes	1.85E+02	40.5	Maximum exceeds benchmark
Magnesium	2	7.46E+03	NC	no	1.72E+04		Low toxicity
Manganese	11	4.61E+02	2.75E+02	yes	8.83E+02		No benchmark; within background
Mercury	4	3.43E+01	3.78E+21	no	1.77E-01		No benchmark; higher than background
Methylene chloride	11	7.11E+00	4.29E+03	no	1.14E-02		No benchmark; higher than background
N-Nitrosodiphenylamine	1	1.78E+02	NC	no	NA		No comparison possible
Naphthalene	7	5.43E+03	9.78E+06	no	ND		No benchmark; ND in background
Nickel	19	3.99E+02	7.98E+01	yes	4.27E+01	30	Maximum exceeds benchmark
Phenanthrene	4	5.14E+01	1.18E+02	no	3.35E-01		No benchmark; higher than background
Phenol	1	1.78E+02	NC	no	NA	30	Maximum exceeds benchmark
Phosphorus	9	1.34E+03	8.98E+02	yes	NA	74	Low toxicity
Potassium	2	1.70E+03	2.31E+03	no	4.73E+03		Low toxicity
Ругепе	2	1.91E+01	NC	no	4.35E-01		No benchmark; higher than background
Silver	1	1.20E+01	NC	no	1.35E+00	2	Maximum exceeds benchmark
Total PCBs	7	4.43E+03	6.93E+16	no	1,20E+00	0.371	Maximum exceeds benchmark
Tetrachloroethene	8	5.86E+01	3.30E+01	yes	NA	FOR SHAPE OF SHAPE	No comparison possible
Tin	2	8.00E+01	NC	· no	NA	50	Maximum exceeds benchmark
Toluene	6	1.18E+02	8.71E+01	no	ND	200	Maximum less than benchmark
Total Xylenes	6	4.15E+01	1.36E+06	no	ND		No benchmark; ND in background
Trichloroethene	4	3.85E+00	1.85E+01	no	ND		No benchmark; ND in background
/anadium	11	1.32E+03	4.44E+02	yes	6.90E+01	2	Maximum exceeds benchmark
Zinc	19	4.26E+03	1.02E+03	yes	8.08E+02	8.5	Maximum exceeds benchmark
rans-1,2-Dichloroethene	1	7.00E-01	NC	no	NA	THE RESERVE THE PARTY OF THE PA	No comparison possible

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil) and no benchmark is available.

NC= value was not calculated
NA= background soil concentrations were not available for these constituents

#### Table 7-29b Comparison of Site H Subsurface Soil Concentrations to Ecological Benchmarks Sauget Area I

Constituent (mg/kg)	Number of Samples for Statistics	Maximum (mg/kg)	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration (mg/kg)	Soil Benchmark (mg/kg) <sup>1</sup>	Comment		
1,2,4-Trichlorobenzene	6	7.58E+03	4.42E+22	no	NA	20	Maximum exceeds benchmark		
1,2-Dichlorobenzene	3	1.94E+04	1.38E+134	no	NA		No comparison possible		
1,2-Dichloroethane	1	1.20E-02	NC	no	NA		No comparison possible		
1,3-Dichlorobenzene	3	2.42E+02	1.28E+17	no	NA		No comparison possible		
1,4-Dichlorobenzene	5	3.06E+04	8.14E+38	no	NA	20	Maximum exceeds benchmark		
2,4,6-Trichlorophenol	2	6.13E+02	NC	no	NA	4	Maximum exceeds benchmark		
2,4-Dichlorophenol	5	7.42E+02	2.30E+17	no	NA		No comparison possible		
2,4-Dimethylphenol	1	9.20E-02	NC	no	NA		No comparison possible		
2-Butanone (MEK)	5	2.72E+01	2.51E+01	no	ND		No benchmark; ND in background		
2-Methylnaphthalene	3	3.47E+02	1.00E+82	no	ND		No benchmark; ND in background		
4,4'-DDE	2	7.80E-01	1.51E+00	no	1.61E-02		No benchmark; higher than background		
4,4'-DDT	2	9.23E-01	1.30E+00	no	1.41E-02		No benchmark; higher than background		
4-4'-DDD	1	4.31E-01	NC	no	ND		No benchmark; ND in background		
4-Methyl-2-pentanone	4	7.85E+00	1.90E+15	no	NA		No comparison possible		
4-Methylphenol	1	1.72E-01	NC	no	NA		No comparison possible		
4-Nitroariline	1	1.83E+03	NC	no	NA		No comparison possible		
Acenaphthylene	3	3.78E+02	4.03E+84	no	ND		No benchmark; ND in background		
Acetone	11	2.11E+01	1.58E+03	no	ND		No benchmark; ND in background		
Numinum	11	1.21E+04	1.08E+04	yes	2.54E+04	NAME OF TAXABLE PARTY.	No benchmark; within background		
Anthracene	4	6.80E+02	1.80E+34	no	1.60E-01		No benchmark; higher than background		
Arsenic	2	2.60E+01	NC	no	1.91E+01	9.9	Maximum exceeds benchmark		
Barium	11	3.24E+03	5.87E+03	no	3.63E+02	283	Maximum exceeds benchmark		
Benzene	7	6.13E+01	1.27E+12	no	ND		No benchmark; ND in background		
Benzo(a)anthracene	3	3.78E+02	9.26E+60	no	2.40E-01		No benchmark; higher than background		
Benzo(a)pyrene	2	2.72E+02	NC	no	1.87E-01		No benchmark; higher than background		
Benzo(b)fluoranthene	3	2.11E+02	1.37E+50	no	1.79E-01		No benchmark; higher than background		
Benzo(g,h,i)perylene	2	1.13E+02	NC	no	1.27E-01		No benchmark; higher than background		
Benzoic acid	2	2.64E+00	NC	no	NA		No comparison possible		
Benzyl alcohol	1	7.92E+00	NC	no	NA		No comparison possible		
Cadmium	4	2.94E+02	3.36E+02	no	8.65E+00	4	Maximum exceeds benchmark		
Chlorobenzene	6	4.52E+02	2.94E+17	no	ND	40	Maximum exceeds benchmark		
Chloroform	2	1.92E-01	5.61E-01	no	NA		No comparison possible		
Chromium	8	1.00E+02	6.37E+02	no	3.93E+01		No benchmark; higher than background		
Chrysene	3	3.32E+02	5.95E+47	no	2.73E-01		No benchmark; higher than background		
Cobalt	5	1.05E+02	7.44E+03	no	1.55E+01	20	Maximum exceeds benchmark		
Copper	8	2.44E+03	1.74E+06	no	2.09E+02	60	Maximum exceeds benchmark		
Cyaride	2	2.00E+00	NC	no	NA		No comparison possible		
Di-N-butyl phthalate	8	2.57E+01	2.84E+01	no	3.12E-01	200	Maximum less than benchmark		
Dibenzofuran	4	6.04E+01	2.26E+15	no	ND		No benchmark; ND in background		
Dibenzo(a,h)anthracene	1	3.17E+01	NC	no	ND		No benchmark; ND in background		
Ethylbenzene	3	1.28E+01	1.63E+01	no	ND		No benchmark; ND in background		
Fluoranthene	4	1.33E+03	8.60E+34	no	5.02E-01		No benchmark; higher than background		
Fluorene	3	4.83E+02	7.75E+78	no	ND		No benchmark; ND in background		
Hexachlorobenzene	1	7.14E-01	NC	no	NA		No comparison possible		
deno(1,2,3-cd)pyrene	1	1.36E+02	NC	no	ND		No benchmark; ND in background		
ron	11	8.45E+04	4.98E+05	no	3.80E+04		No benchmark; higher than background		
.ead	2	1.15E+03	NC 2745.00	no	1.85E+02	40.5	Maximum exceeds benchmark		
Manganese	11	3.65E+04	2.74E+06	no	8.83E+02		No benchmark; higher than background		
Mercury	3	3.90E+00	1.78E+03	no	1.77E-01		No benchmark; higher than background		
Methylene chloride	11	5.56E+01	8.47E+03	no	1.14E-02		No benchmark; higher than background		
N-Nitrosodiphenylamine	1	1.00E-07	NC 1505	no	NA		No comparison possible		
Vaphthalene	4	2.27E+03	1.59E+44	no	ND	<b>为此等上的。此类</b>	No benchmark; ND in background		
lickel	10	1.51E+04	3.57E+06	no	4.27E+01	30	Maximum exceeds benchmark		
Phenanthrene	6	2.11E+03	3.01E+14	no	3.35E-01	A SECRETARIO	No benchmark; higher than background		
Phenol	1	4.22E-01	NC FORTH	no	NA 1355 01	30	Maximum less than benchmark		
Pyrene	3	6.64E+02	5.05E+63	no	4.35E-01	0.01	No benchmark; higher than background		
Selerium	1	2.00E+00	NC	no	ND	0.21	Maximum exceeds benchmark		
Silver Total PCBs	2	4.40E+01	NC E 45E 145	no	1.35E-03	2	Maximum exceeds benchmark		
Total PCBs Tetrachloroethene	7	1.80E+04	5.45E+15	no	1.20E+00	0.371	Maximum exceeds benchmark		
Marie and the supplemental field of the supplemental states of the suppleme	26 1616	5.65E+00	NC	no	NA NA	MISSING PLANSING	No comparison possible		
Thallium Thallium	1	1.00E+00	NC 4.05E+07	no	ND	1	Maximum within benchmark		
īn .	3	1.11E+02	1.05E+07	no	NA ND	50	Maximum exceeds benchmark		
Toluene	5	7.65E+01	2.05E+10	no	ND	200	Maximum less than benchmark		
Total Xylenes	3	2.36E+01	3.46E+01	no	ND		No benchmark; ND in background		
Trichloroethene	1	1.00E-02	NC	no	ND		No benchmark; ND in background		
/anadium	6	9.50E+01	1.97E+02	no	6.90E+01	2	Maximum exceeds benchmark		
inc	11	3.95E+04	1.61E+07	no	8.08E+02	8.5	Maximum exceeds benchmark		
ois(2-ethylhexyl)phthalate	4	6.14E-01	1.10E+00	no	3.22E-01		No benchmark; higher than background		

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent was not detected in background soil) and no benchmark is available.

NC= value was not calculated

NA= background soil concentrations were not available for these constituents

#### Table 7-29c Comparison of Site I Subsurface Soil Concentrations to Ecological Benchmarks Sauget Area I

Constituent (mg/kg)	Number of Samples for Maximum Statistics (mg/kg)		95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration (mg/kg)	Soil Benchmark (mg/kg) <sup>1</sup>	Comment		
1,1,1-Trichloroethane	2	1.69E+00	NC	no	NA		No comparison possible		
,2,4-Trichlorobenzene	8	8.26E+03	1.17E+06	no	NA	20	Maximum exceeds benchmark		
,2-Dichlorobenzene	6	3.24E+02	7.93E+04	no	NA		No comparison possible		
,3-Dichlorobenzene	2	7.01E+01	NC	no	NA		No comparison possible		
,4-Dichlorobenzene	8	1.84E+03	1.26E+05	no	NA	20	Maximum exceeds benchmark		
4-Dichlorophenol	1	9.00E+00	NC	no	NA		No comparison possible		
Butanone (MEK)	15	1.69E+01	9.61E+00	yes	ND		No benchmark; ND in background		
Methylnapthalene	7	1.69E+02	2.64E+03	no	ND		No benchmark; ND in background		
4'-DDT	1	4.31E+00	NC	no	1.41E-02		No benchmark; higher than background		
4'-DDD	2	2.97E+01	NC	no	ND		No benchmark; ND in background		
Chloroaniline	1	4.32E+01	NC	no	NA		No comparison possible		
Methyl-2-pentanone	2	4.16E+00	NC	no	NA		No comparison possible		
cenapthene	1	1.40E+01	NC	no	ND	20	Maximum less than benchmark		
cetone	16	1.69E+01	2.17E+01	no	ND		No benchmark; ND in background		
uminum	16	1.35E+04	7.92E+03	. yes	2.54E+04		No benchmark; within background		
nthracene	2	2.03E+02	NC	no	1.60E-01		No benchmark; higher than background		
ntimony	3	6.66E+03	5.78E+53	no	3.80	5	Maximum exceeds benchmark		
rsenic	9	1.40E+01	2.05E+01	no	1.91E+01	9.9	Maximum exceeds benchmark		
arium	10	3.60E+03	4.82E+04	no '	3.63E+02	283	Maximum exceeds benchmark		
enzene	10	2.41E+01	2.34E+02	no	ND		No benchmark; ND in background		
enzo(a)anthracene	2	6.72E+00	NC	no	2.40E-01		No benchmark; higher than background		
enzo(a)pyrene	1	2.47E+00	NC	no	1.87E-01		No benchmark; higher than background		
enzo(b)fluoranthene	2	3.24E+01	NC	no	1.79E-01		No benchmark; higher than background		
enzoic acid	1	6.21E+01	NC	no	NA		No comparison possible		
eryllium	1	1.53E+03	NC	no	1.51E+00	10	Maximum exceeds benchmark		
ıtyl benzyl phthalate	1	1.39E+02	NC	no	ND		No benchmark; ND in background		
entachlorophenol(PCP)	1	1.92E+02	NC	no	7.42E-01	3	Maximum exceeds benchmark		
admium	7	1.30E+01	1.84E+01	no	8.65E+00	4	Maximum exceeds benchmark		
hlorobenzene	12	1.27E+02	7.16E+04	no	ND	40	Maximum exceeds benchmark		
hromium	14	7.31E+02	3.60E+02	yes	3.93E+01		No benchmark; higher than background		
hrysene	2	5.59E+00	9.88E+00	no	2.73E-01		No benchmark; higher than background		
obalt	7	1.40E+02	1.05E+02	no	1.55E+01	20	Maximum exceeds benchmark		
opper	8	6.30E+02	2.10E+03	no	2.09E+02	60	Maximum exceeds benchmark		
yanide	3	3.18E+03	1.14E+80	no	NA		No comparison possible		
i-N-butyl phthalate	8	2.03E+02	3.15E+04	no	3.12E-01	200	Maximum exceeds benchmark		
ibenzofuran	1	5.59E+00	NC	no	ND		No benchmark; ND in background		
iethylphthalate	1	1.69E+01	NC	no	1.87E-01	100	Maximum less than benchmark		
hylbenzene	10	1.51E+01	1.14E+02	no	ND		No benchmark; ND in background		
uoranthene	3	2.03E+02	3.81E+13	no	5.02E-01		No benchmark; higher than background		
uorene	3	3.54E+01	7.33E+08	no	ND		No benchmark; ND in background		
exachlorobenzene	7	1.27E+03	2.10E+03	no	NA		No comparison possible		
exachloroethane	1	3.01E+00	NC	no	NA NA		No comparison possible		
on	16	4.15E+04	3.11E+04	yes	3.80E+04	40.7	No benchmark; within background		
ead	15	2.33E+04	3.08E+05	no	1.85E+02	40.5	Maximum exceeds benchmark		
anganese	1	9.80E+01	NC OCCUPANT	no	8.83E+02	THE RESERVE THE PARTY OF THE PA	No benchmark; within background		
ercury	5	3.20E+00	2.69E+00	no	1.77E-01		No benchmark; higher than background		
ethylene chloride	16	6.77E+00	1.64E+02	no	1.14E-02		No benchmark; higher than background		
-Nitrosodiphenylamine	2	1.00E+02	NC FREE OF	no	NA NA		No comparison possible		
aphthalene	7	5.15E+02	5.75E+05	no	ND 4 07E+04	20	No benchmark; ND in background		
ckel	12	2.41E+03	2.50E+04	no	4.27E+01	30	Maximum exceeds benchmark		
nenanthrene	5	1.02E+02	6.24E+04	no	3.35E-01	20	No benchmark; higher than background		
nenol	2	2.70E+01	NC 9 42E+05	no	NA 4.35E-01	30	Maximum less than benchmark		
rene	4	4.93E+01	8.42E+05	no		0.24	No benchmark; higher than background		
elenium etal PCPs	1	1.32E+03	NC 3 06E+03	no	ND	0.21	Maximum exceeds benchmark  Maximum exceeds benchmark		
otal PCBs	5	3.43E+02	3.06E+02	no	1.20E+00	0.3/1	NAMES OF THE OWNER, THE PARTY OF THE PARTY O		
etrachloroethene	5	5.27E+00	1.81E+01	no	NA NA	FO	No comparison possible		
n	9	5.50E+01	1.15E+02	no	NA	50	Maximum exceeds benchmark		
oluene	11	7.79E+01	4.10E+02	no	ND	200	Maximum less than benchmark		
otal Xylenes	10	1.92E+01	2.70E+02	no	ND		No benchmark; ND in background		
oxaphene	1	4.93E+02	NC	no	NA		No comparison possible		
richloroethene	2	3.81E+00	1.22E+01	no	ND		No benchmark; ND in background		
anadium	7	5.53E+02	8.22E+02	no	6.90E+01	2	Maximum exceeds benchmark		
nc	16	6.33E+03	5.00E+03	yes	8.08E+02	8.5	Maximum exceeds benchmark		
s(2-ethylhexyl)phthalate	7	1.31E+02	7.45E+02	no	3.22E-01	Charles of	No benchmark; higher than background		
ans-1,2-Dichloroethene	1	3.00E-03	NC	no	NA		No comparison possible		

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent

was not detected in background soil) and no benchmark was available. NC= value was not calculated NA= background soil concentrations were not available for these constituents

#### Table 7-29d Comparison of Site L Subsurface Soil Concentrations to Ecological Benchmarks Sauget Area I

			- T					
Constituent (mg/kg)	Number of Samples for Statistics	Maximum (mg/kg)	95% UCL	95% UCL Represents Site Concentration	Twice Average Background Soil Concentration (mg/kg)	Soil Benchmark (mg/kg) <sup>1</sup>	Comment	
,2,4-Trichlorobenzene	3	7.90E+01	1.21E+02	no	NA	20	Maximum exceeds benchmark	
,2-Dichlorobenzene	4	7.70E+00	7.23E+00	no	NA		No comparison possible	
3-Dichlorobenzene	1	4.30E+00	NC	no	NA		No comparison possible	
,4-Dichlorobenzene	9	1.00E+02	1.29E+07	no	NA	20	Maximum exceeds benchmark	
4,6-Trichlorophenol	1	1.50E+00	NC	no	NA	4	Maximum less than benchmark	
4-Dichlorophenol	2	1.10E+01	NC	no	NA		No comparison possible	
-Butanone (MEK)	3	1.00E+01	6.98E+61	no	ND		No benchmark; ND in background	
Chlorophenol	3	2.60E+00	3.92E+00	no	NA NA		No comparison possible	
-Methylnapthalene	6	3.10E+00	2.36E+00	no	ND		No benchmark; ND in background	
-Chloroaniline	6	2.70E+02 1.67E-01	2.89E+14 1.49E+02	no	NA		No comparison possible	
-Methyl-2-pentanone	5	7.10E+00	6.19E+00	no	NA NA		No comparison possible	
-Methylphenol cenapthene	3	3.10E+00	3.47E+23	no no	NA ND	20	No comparison possible  Maximum less than benchmark	
cenapthylene	1	2.80E-01	NC	no	ND	20	No benchmark; ND in background	
cetone	6	4.56E+00	2.30E+04	no	ND ND		No benchmark, ND in background  No benchmark; ND in background	
uminum	11	1.28E+04	7.82E+03	yes	2.54E+04	Sandy School-Sch	No benchmark; within background	
nthracene	3	4.20E+00	3.58E+31	no	1.60E-01	ESCHOLISTE STATE OF THE STATE O	No benchmark; higher than background	
ntimony	1	3.20E+01	NC NC	no	3.80E+00	5	Maximum exceeds benchmark	
rsenic	10	1.72E+02	4.08E+02	no	1.91E+01	9.9	Maximum exceeds benchmark	
arium	15	1.44E+03	5.47E+04	no	3.63E+02	283	Maximum exceeds benchmark	
enzene	5	5.70E+00	6.67E+13	no	ND		No benchmark; ND in background	
enzo(a)anthracene	4	8.60E+00	9.54E+08	no	2.40E-01		No benchmark; higher than background	
enzo(a)pyrene	3	5.30E+00	8.81E+35	no	1.87E-01		No benchmark; higher than background	
Senzo(b)fluoranthene	3	5.40E+00	2.48E+24	no	1.79E-01		No benchmark; higher than background	
enzo(g,h,l)perylene	1	2.70E-02	NC	no	1.27E-01		No benchmark; within background	
enzo(k)fluoranthene	1	4.60E+00	NC	no	2.08E-01		No benchmark; higher than background	
enzoic acid	2	3.20E+00	NC	no	NA		No comparison possible	
utyl benzyl phthalate	1	5.40E+00	NC	no	ND		No benchmark; ND in background	
entachlorophenol(PCP)	4	5.82E+01	2.13E+02	no	7.42E-01	3	Maximum exceeds benchmark	
cadmium	6	4.20E+01	1.32E+10	no	8.65E+00	4	Maximum exceeds benchmark	
calcium	6	7.55E+04	6.01E+04	no	3.35E+04		Low toxicity	
chlorobenzene	8	5.30E+00	2.41E+03	no	ND	40	Maximum less than benchmark	
Chloroform	3	2.03E+01	2.66E+48	no	NA NA		No comparison possible	
chromium	10	2.70E+01	2.36E+01	yes	3.93E+01	COLUMN TO SERVICE SERVICE	No benchmark; within background	
chrysene	4	8.20E+00	7.34E+08	no	2.73E-01		No benchmark; higher than background	
Cobalt	7	9.00E+00	8.67E+00	no	1.55E+01	20	Maximum less than benchmark	
Copper	10	3.08E+02	4.33E+02	no	2.09E+02	60	Maximum exceeds benchmark	
Cresol(m,p)	1	1.90E-01 4.60E-01	2.58E-01 NC	no	NA NA		No comparison possible	
cyanide vi-N-butyl phthalate	4	2.78E+00	3.15E+03	no no	NA 3.12E-01	200	No comparison possible  Maximum less than benchmark	
libenzofuran	2	3.00E+00	NC NC	no	ND	200	No benchmark; ND in background	
iethylphthalate	2	1.00E+00	NC	no	1.87E-01	100	Maximum less than benchmark	
ithylbenzene	1	4.00E-02	NC	no	ND	100	No benchmark; ND in background	
luoranthene	4	1.60E+01	2.05E+09	no	5.02E-01		No benchmark, higher than background	
luorene	2	5.00E+00	NC NC	no	ND ND		No benchmark; ND in background	
lexachlorobenzene	1	4.80E+00	NC	no	NA NA		No comparison possible	
lexachloroethane	1	4.90E-02	NC	no	NA NA		No comparison possible	
deno(1,2,3-cd)pyrene	2	2.90E+00	NC	no	ND		No benchmark; ND in background	
on	11	2.40E+04	1.45E+04	yes	3.80E+04		No benchmark; within background	
ead	13	6.64E+02	5.83E+03	no	1.85E+02	40.5	Maximum exceeds benchmark	
lagnesium	6	9.44E+03	7.92E+03	no	1.72E+04	医牙骨炎 化邻	No benchmark; within background	
anganese	11	7.82E+02	3.68E+03	no	8.83E+02		No benchmark; within than background	
ercury	7	1.80E+00	6.02E+01	no	1.77E-01		No benchmark; higher than background	
ethylene chloride	5	2.28E+00	5.92E+07	no	1.14E-02		No benchmark; higher than background	
aphthalene	4	7.30E+00	7.72E+06	no	ND		No benchmark; ND in background	
ickel	10	2.39E+03	2.67E+03	no	4.27E+01	30	Maximum exceeds benchmark	
henanthrene	5	2.30E+01	1.33E+06	no	3.35E-01	20	No benchmark; higher than background	
henol	5	1.60E+01	1.57E+01	no	NA	30	Maximum less than benchmark	
otassium	6	2.28E+03	1.86E+03	no	4.73E+03	THE RESERVE OF THE PERSON NAMED IN	No benchmark; within background	
yrene etal PCRe	4	2.30E+01	3.48E+10	no	4.35E-01	0.274	No benchmark, higher than background	
otal PCBs	2	5.00E+02	NC	no	1.20E+00	0.371 200	Maximum exceeds benchmark  Maximum exceeds benchmark	
oluene	7	4.00E+02	3.21E+09	no	ND	200	A STATE OF THE RESIDENCE OF THE PARTY OF THE	
otal Xylenes	4	1.10E+01	2.48E+06	no	ND SOOT OF		No benchmark; ND in background	
anadium	9	1.31E+02	7.51E+01	yes	6.90E+01	2	Maximum exceeds benchmark	
inc s(2-ethylhexyl)phthalate	11 6	4.24E+03 2.20E+00	1.61E+04 1.61E+00	no no	8.08E+02 3.22E-01	8.5	Maximum exceeds benchmark  No benchmark; higher than background	

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints

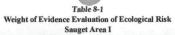
Yellow shading indicates maximum site concentration exceeds benchmark.

Green shading indicates upper 95% UCL concentration (or maximum if 95% UCL not available) exceeds twice average background concentration (or constituent

was not detected in background soil) and no benchmark available.

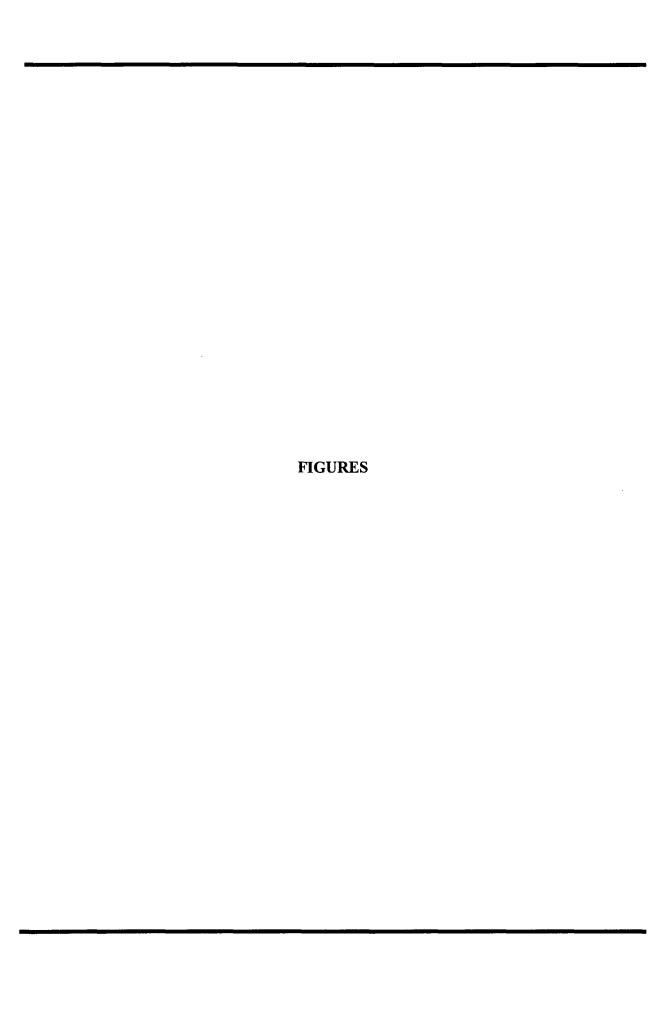
NC= value was not calculated

NA= background soil concentrations were not available for these constituents



	Assessment Endpoint 1  Sustainability of warm water fish  Welghing Factors (increasing Confidence or Weight)				Assessment Endpoint	Assessment Endpoint 3  Survival, growth, and reproduction of bald eagles			Assessment Endpoint 4 Survival, growth, and reproduction of terrestrial wildlife in			
Harm/Magnitude				Survival, growth, and reproduction of aquatic wildlife species  Weighing Factors (Increasing Confidence or Weight)			Weighing Factors (Increasing Confidence or Weight)			floodplain  Weighing Factors (Increasing Confidence or Weight)		
	Low Weight	Medium Weight	$\longrightarrow$	Low Weight	Medium Weight	High Weight	Low Weight		High Weight	Low Weight	Medium Weight	High Weight
Yes/High												
Yes/Low	1c - COPCs exceed sediment guidelines for benthic invertebrates	1a - fish body burdens indicate exposure to site- related COPCs		2d - food chain modeling indicated potential risk to great blue heron that eats Borrow Pit Lake fish due to mercury	2b, 2d, 2e - concentrations in plants, fish, clams, and shrimp indicate exposure to site-related COPCs			3a - concentrations in fish indicate potential exposure to site-related COPCs - measure of exposure rather than effect		4a - concentratons of COPCs in surface soil exceed some screening benchmarks		
		1a - mercury concentrations in some fish exceed toxic benchmark		2e food chain modeling indicated potential risk to muskrat that eats enails from CS-F due to aluminum, mitmony, copper, and dioxin (based on BAF modeling)								
		1c - sediments exhibit toxicity (similar to other water bodies in region)		2e food chain modeling indicated potential risk to tree swallow that eats aquatic insacts from CSF and Borrow Pit Lake due to alaminum, chromium, mercury, zine, PCBs, DDT, copper, and dioxin (based on BAF modeling)								
Undetermined					9.6							
		1e - benthic community reflects available habitat	1h - COPCs that exceed surface water criteria are soil constituents (Al, Ba, Fe, Mn) and likely to be due to entrained sediment	2a - species use of habitat is high	Ze - surface water concentrations do not present a risk to wildlife		3a - food chain modeling indicated no risk to bald eagles eating fish from Borrow Pit or Dead Creek Section F					
No Risk				2b, 2e - food chain modeling indicated no risk to mallards that eat plants or snails (CS-F); risks to muskrats eating plants (CS-F) and classified (BPL) due to aluminum is indistinguishable from background risks								
				2d, 2e - food chain modeling indicated no risk to river otter that eats fish (CS-F and BPL) or clams (BPL), no risk to mallard that eats shring (BPL), no risk to heron that eat CS F fish (based on BAF modeling)								

	FIELD OBSERVATIONS
Line of Evidence	LABORATORY
Category Key	LITERATURE
	MODELING



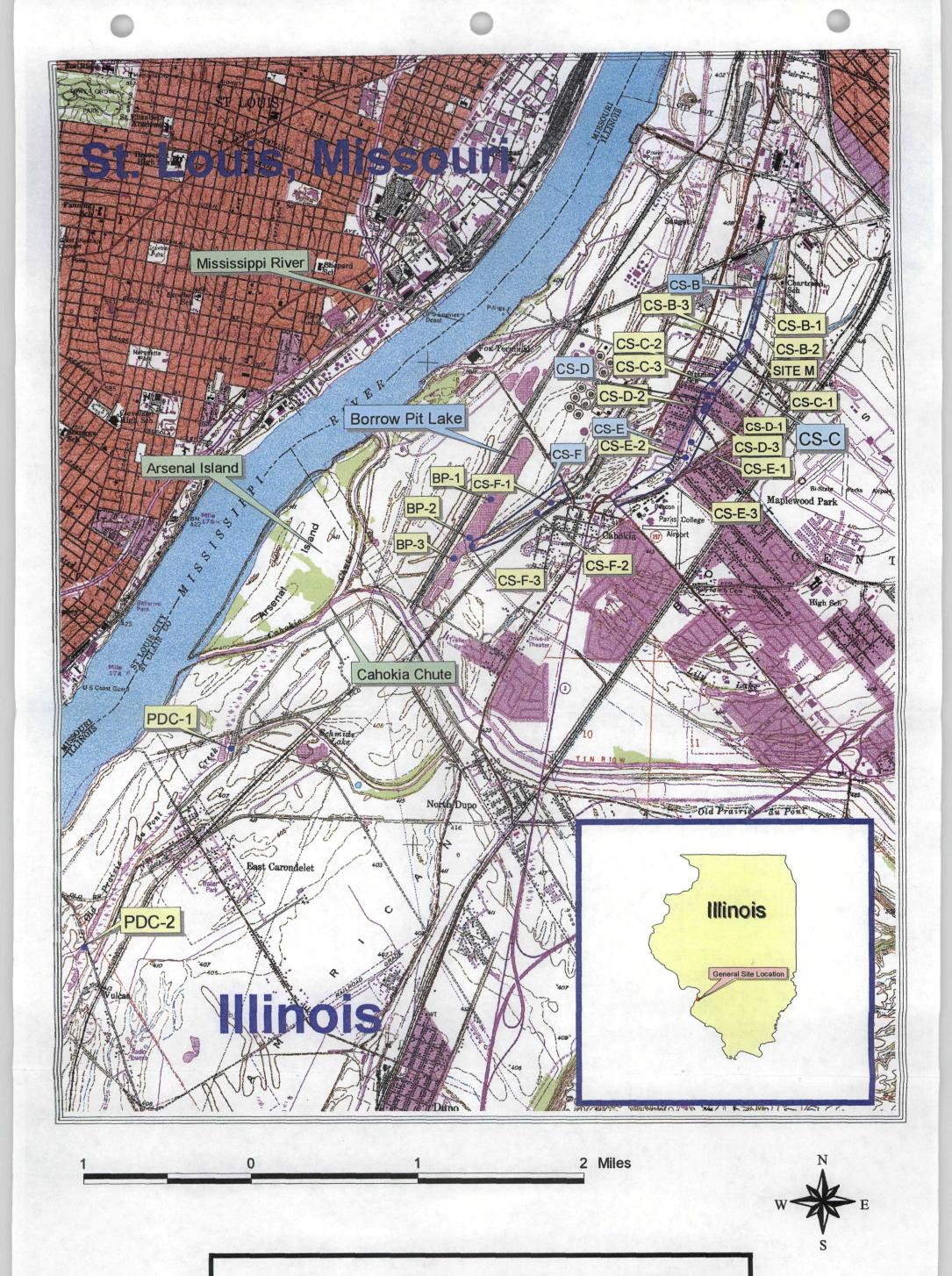


Figure 1-1: Site Locus and Sample Locations
Sauget Area 1
Sauget, Illinois

Figure 2-1: Dead Creek Section F and Borrow Pit Lake Sauget Area 1 Sauget, Illinois

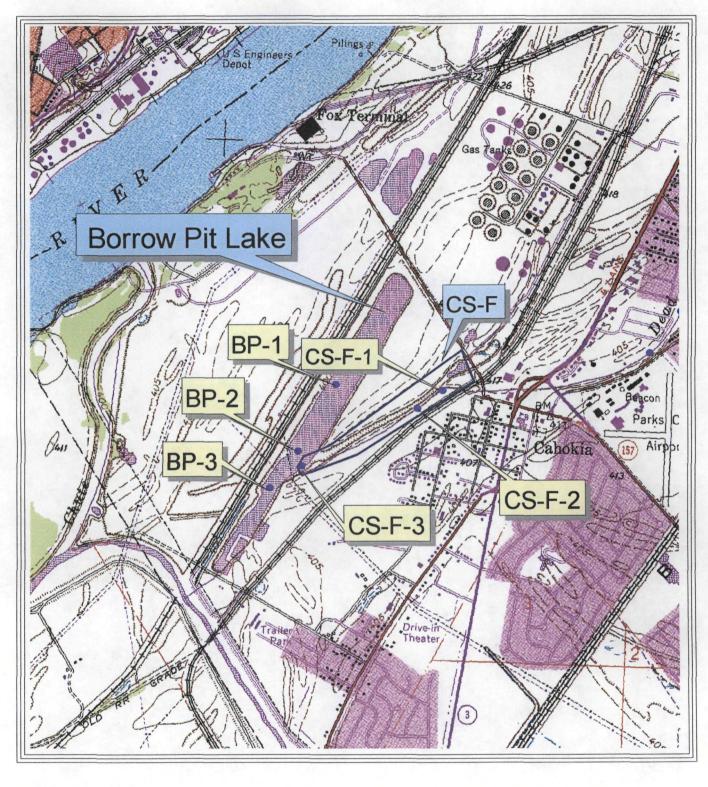






Figure 2-2: Reference Area Locus Sauget Area 1 Sauget, Illinois

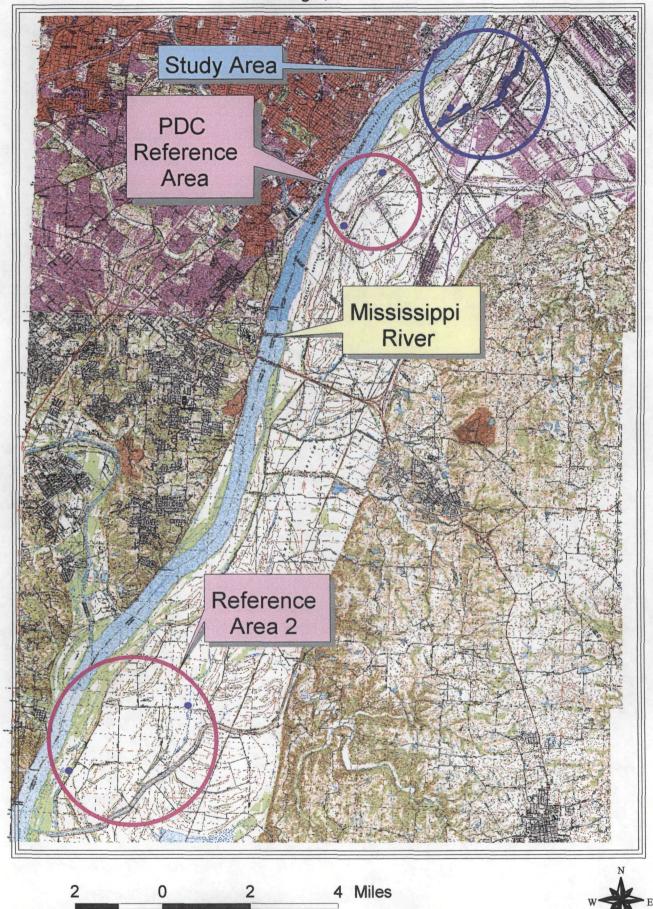


Figure 2-3: Monroe County Reference Areas Sauget Area 1 Sauget, Illinois

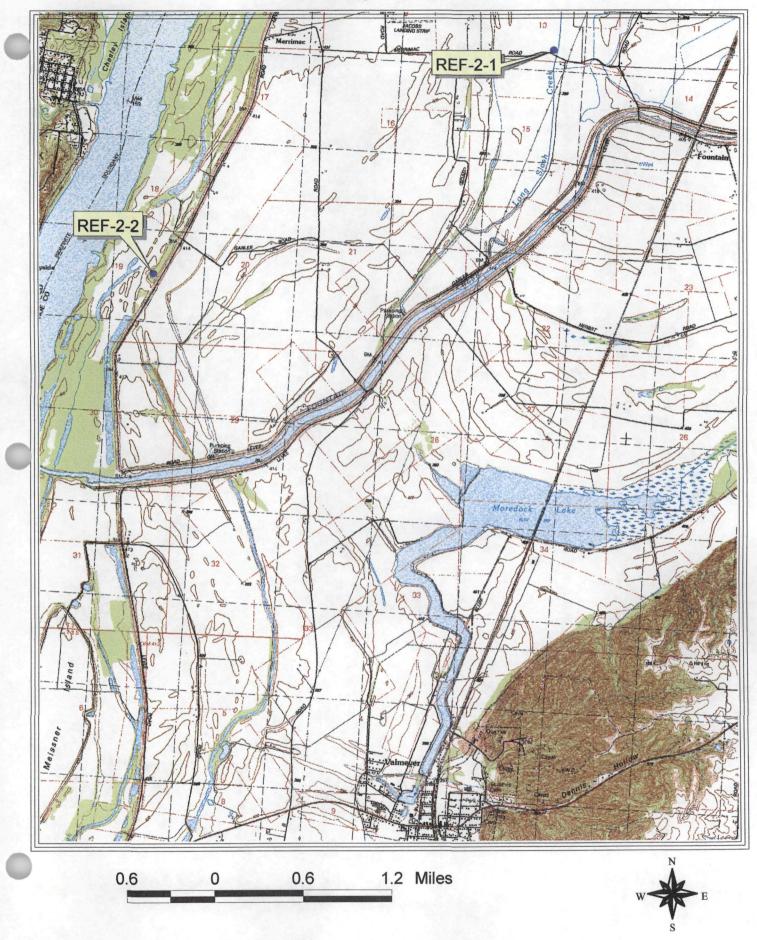
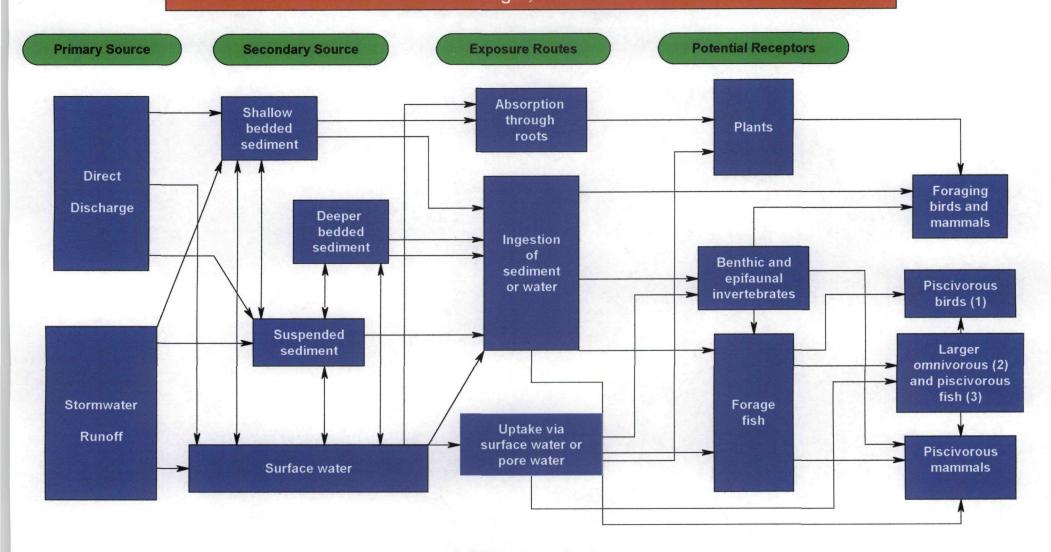


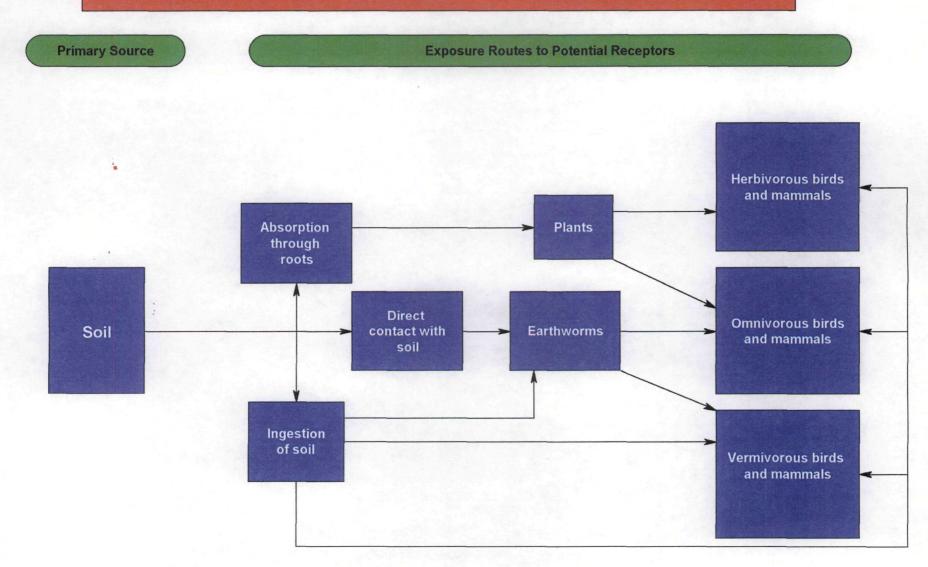
Figure 3-1: Ecological Conceptual Site Model for Dead Creek and Borrow Pit Lake
Sauget Area I
Sauget, Illinois



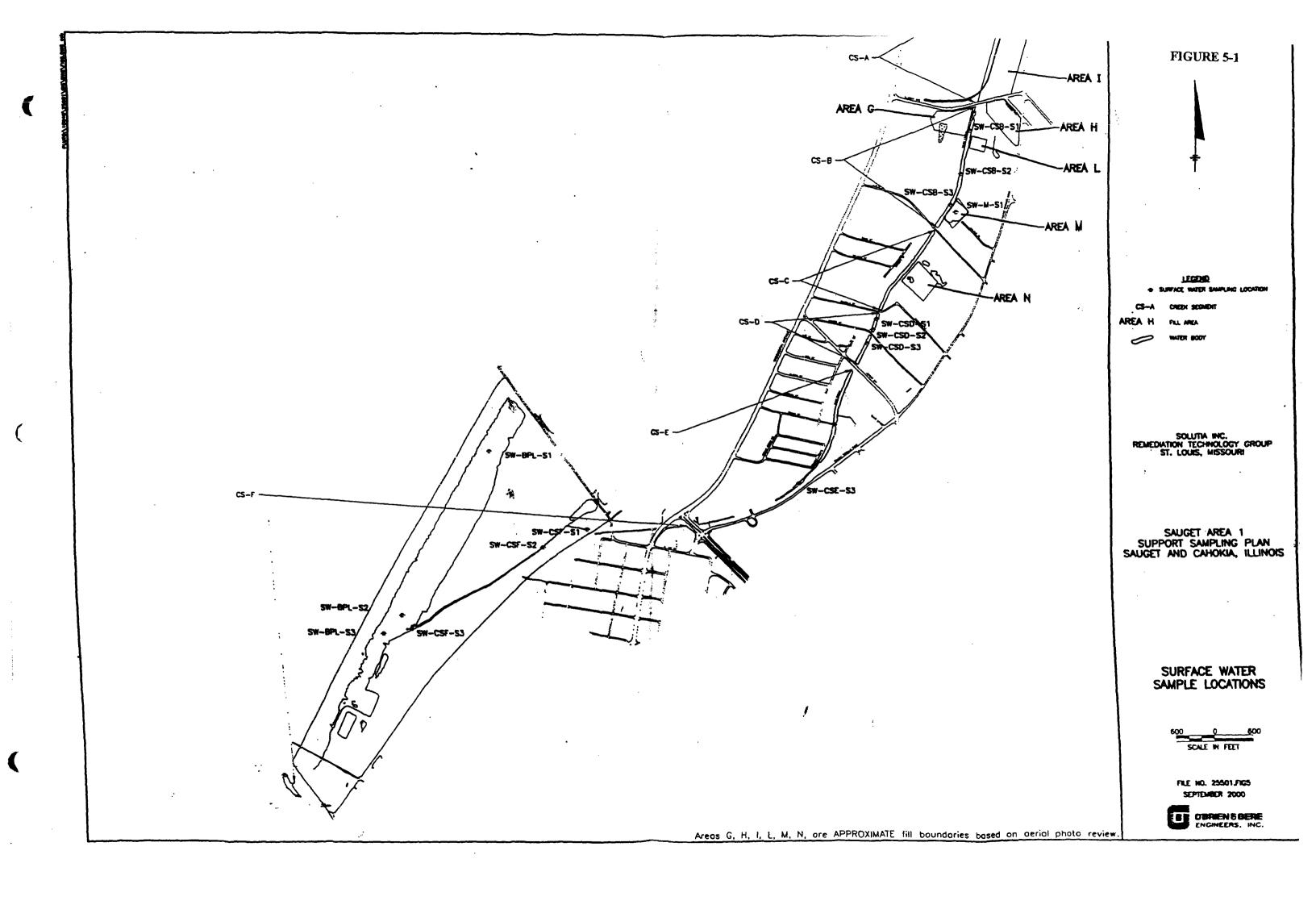
Note: This is a conceptual model that gives an overall view of potential fate and transport of COPCs and potential routes of exposure. It is not intended to represent every exposure that could possibly occur at the site. Other possible routes of exposure not depicted are:

- 1. Piscivorous birds could be exposed via ingestion of surface water.
- 2. Omnivorous fish could be exposed via incidental ingestion of sediment and ingestion of aquatic plants.
- 3. Piscivorous fish could be exposed via incidental ingestion of sediment.

Figure 3-2: Ecological Conceptual Site Model for Terrestrial Receptors and Dead Creek Floodplains
Sauget Area I
Sauget, Illinois



Note: Screening levels (Efroymson et al., 1997) also take into account exposure of carnivorous mammals and raptors via ingestion of small herbivorous and vermivorous mammals.



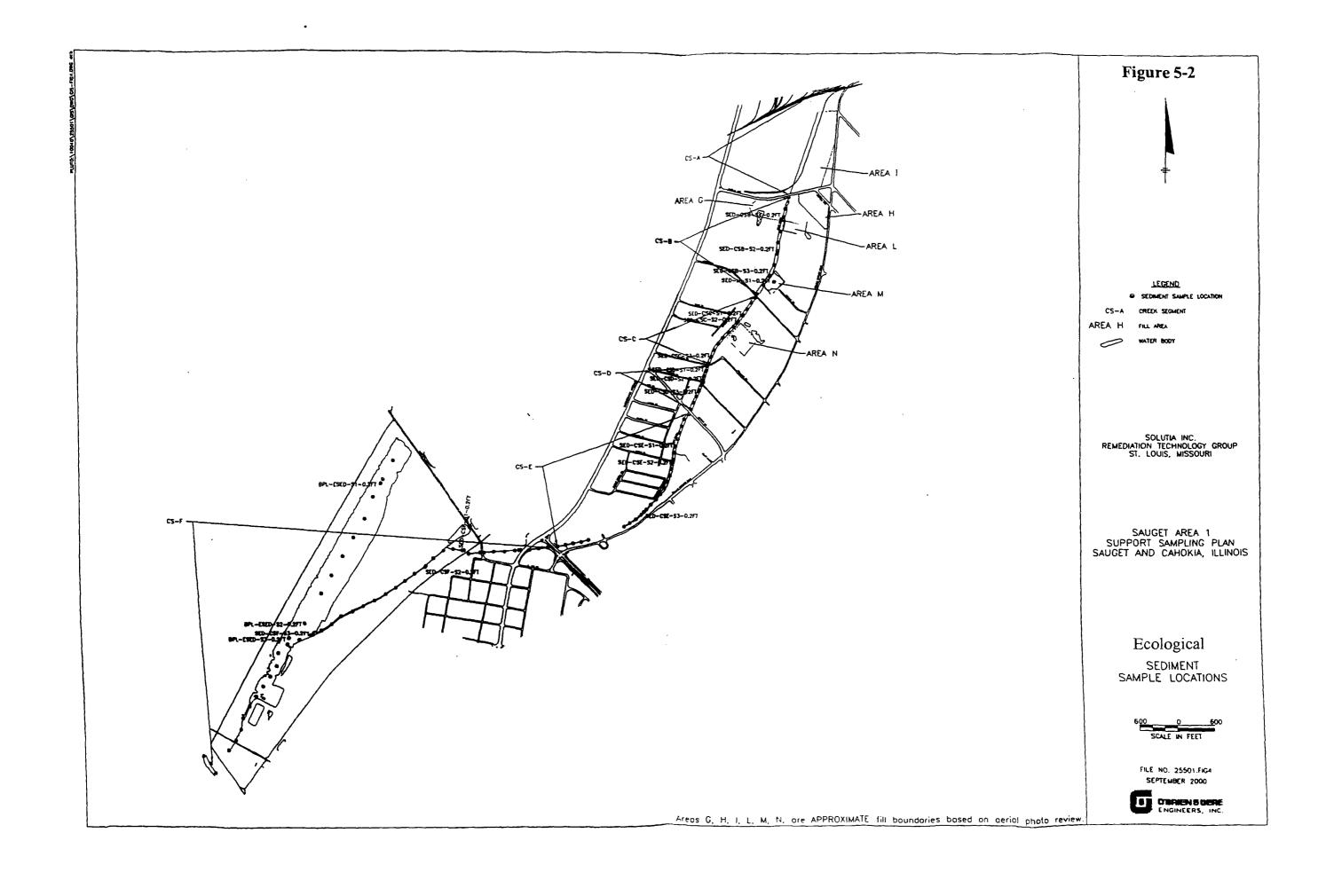
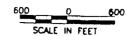


Figure 5-3

**Industry Specific** 

SEDIMENT SAMPLE LOCATIONS



FILE NO. 25501.FIG4 SEPTEMBER 2000



SAUGET AREA 1
SUPPORT SAMPLING PLAN
SAUGET AND CAHOKIA, ILLINOIS

SOLUTIA INC. REMEDIATION TECHNOLOGY GROUP ST. LOUIS, MISSOURI

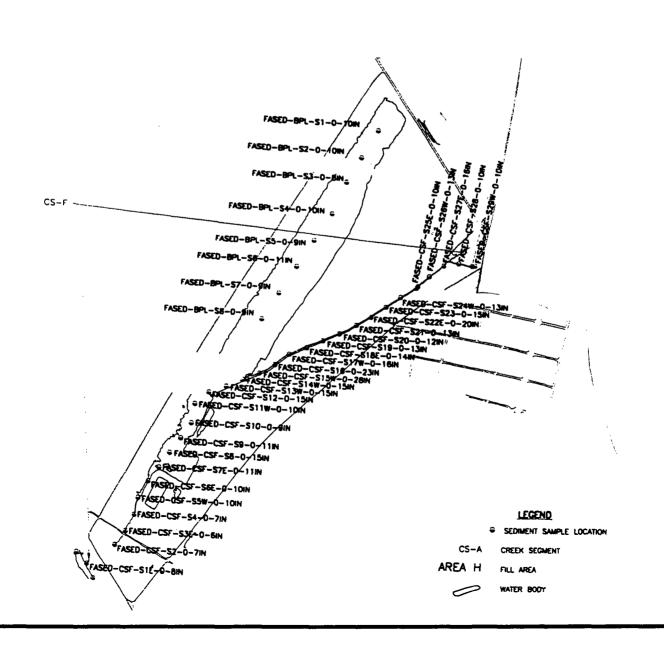
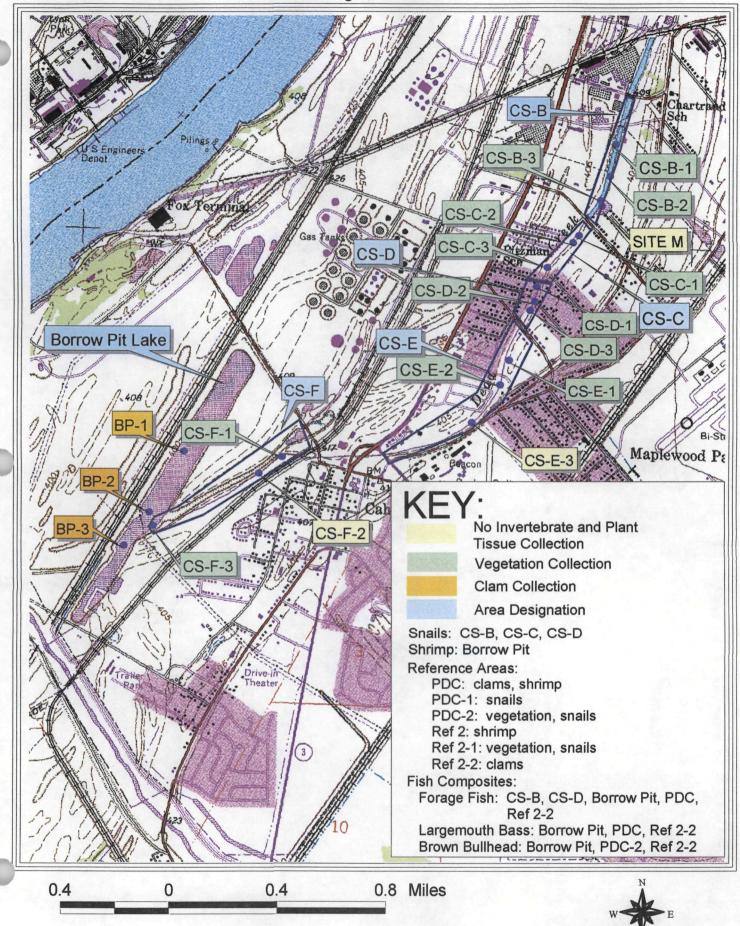


Figure 5-4: Biota Sampling Summary Sauget Area 1 Sauget, Illinois



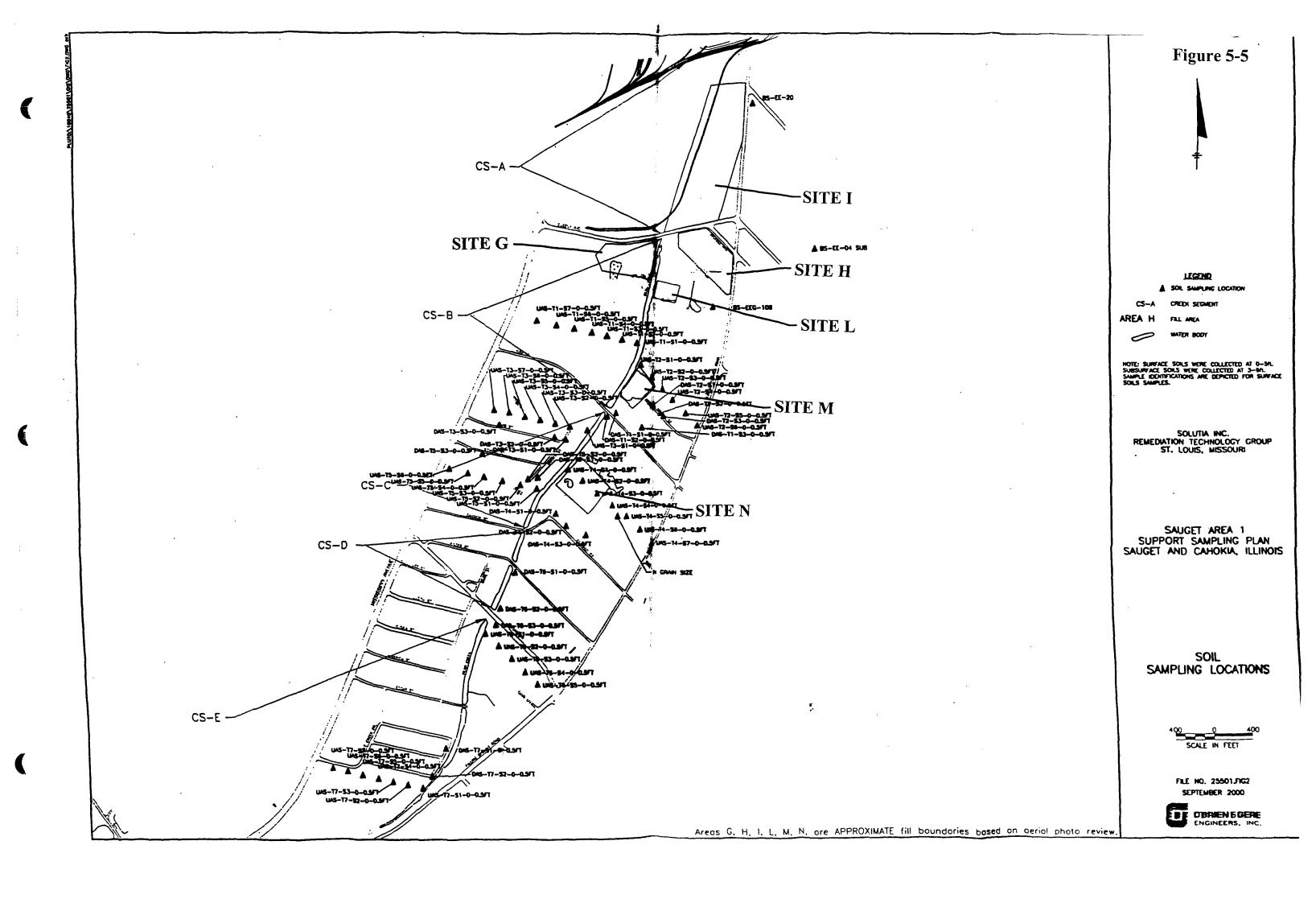
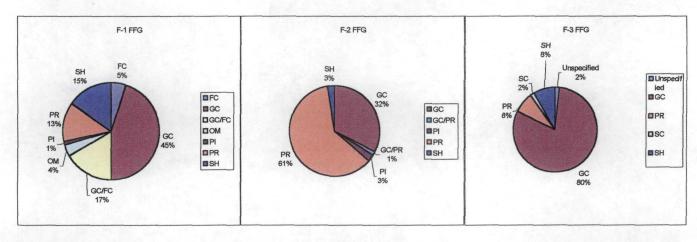
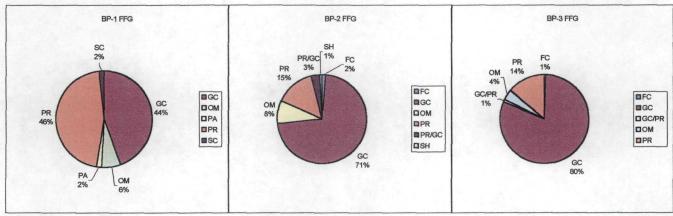
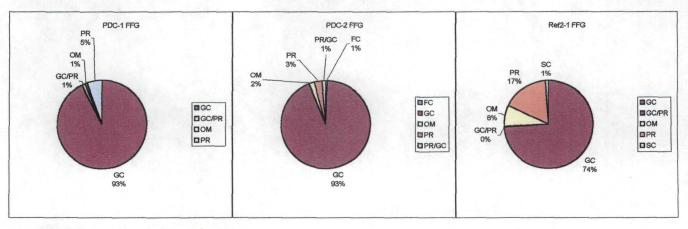


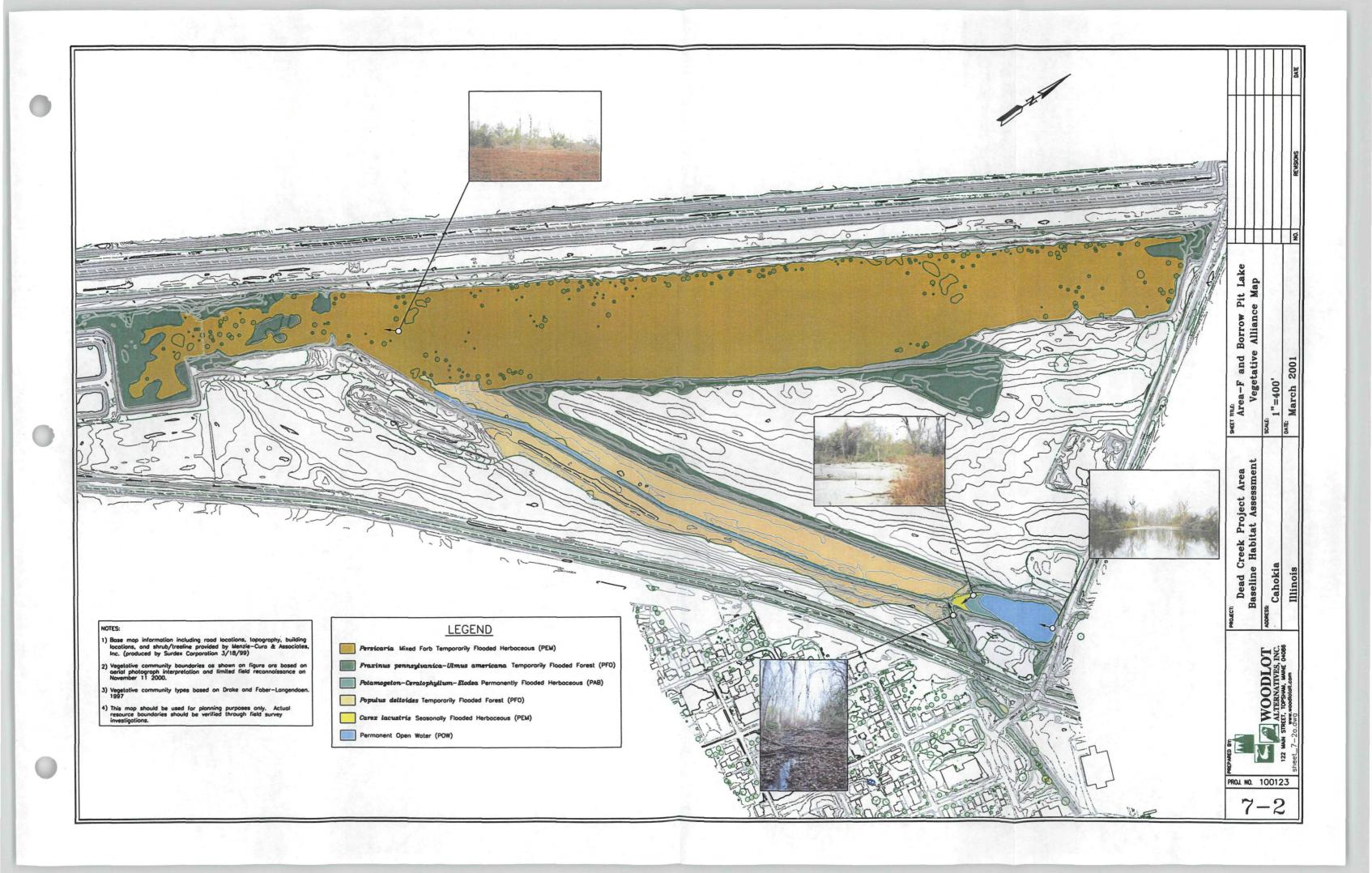
Figure 7-1
Summary of Functional Feeding Group (FFG) Abundance
Dead Creek Section F, Borrow Pit Lake, and Reference Areas
Sauget Area I







FC: Filter/collector GC: Gatherer/collector OM: Omnivore PA: Parasite PI: Piercer PR: Predator SC: Scraper SH: Shredder





# FOR SAUGET AREA I

SAUGET, ST. CLAIR COUNTY, ILLINOIS

August 11, 1999

# Prepared for:

Solutia, Inc. 10300 Olive Boulevard St. Louis, Missouri 63166-6760

# Prepared by:

Menzie-Cura & Associates, Inc. One Courthouse Lane, Suite Two Chelmsford, Massachusetts 01824 Phone: (978) 453-4300

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#### 1.0 INTRODUCTION

### 1.1 Goals and Objectives

This document is a workplan for a baseline ecological risk assessment at the Sauget Area I in Sauget, Illinois. The plan addresses Dead Creek Segments B, M, C, D, E, and F, and recent USEPA comments regarding the development of a baseline ecological risk assessment for this area (USEPA, 1999). It is also contingent upon a planned field reconnaissance of the subject areas. In particular, this planned reconnaissance will help to finalize sampling locations, receptors, and the location of a reference area. Observations made during the reconnaissance may necessitate alterations in the workplan. We will communicate such proposed alterations in a technical amendment to the plan, should they occur.

The plan follows current United States Environmental Protection Agency (USEPA) guidance in:

Ecological Risk Assessment Guidance For Superfund: Process For Designing and Conducting Ecological Risk Assessments (USEPA, 1997a); and

Guidelines for Ecological Risk Assessment (EPA/630/R-95/002F, April, 1998).

The USEPA 1997 guidance document provides an eight-step process. Steps 1 and 2 of this process are a screening level assessment, and Steps 3 through 7 provide guidance for a baseline assessment. The screening level assessment may conclude that site data indicate either:

a negligible ecological risk and therefore the site requires no further study; or, there is (or might be) a risk of adverse ecological effects, and the ecological risk assessment process will continue.

Previously, the USEPA conducted a Preliminary Ecological Assessment of Dead Creek Segment F, which essentially provides the screening analyses required in Steps 1 and 2 of the guidance (USEPA, 1997b). This USEPA assessment concluded that the site warrants further investigation. Therefore this Work Plan addresses the various elements of Steps 3 through 7 of USEPA guidance for designing a baseline ecological risk assessment to Segment F, as well as Segments B, C, D, E even though they have not been subject to a prior screening level assessment. The workplan includes:

- Description of a Site Conceptual Model;
- Selection of Chemicals of Ecological Concern;
- Identification of Assessment Endpoints:
- Selection of Receptors;
- Selection of Measures of effects and their relation to assessment endpoints;
- Risk Characterization;
- Discussion of Uncertainties and Assumptions.

The workplan will explain how the baseline risk assessment will use data described in the Quality Assurance Project Plan/Field-Sampling Plan (QAPP/FSP), that has been prepared and

submitted separately. The FSP for the baseline ecological risk assessment describes the details of the field sampling effort as well as the data analysis methods and data quality objectives (DOOs). These include methods for:

conducting a field reconnaissance;

collecting vegetation and benthic organisms in Creek Sectors B to F, M, and the reference areas, and analyzing them for target analytes;

collecting forage fish, predator fish, bottom fish and crayfish in Creek Sector F and the reference areas, and analyzing them for target analytes (we will also collect these organisms in segments B,C,D,E, and, M if observed in those areas);

collecting sediments in Creek Sectors B to F, M, and the reference areas for sediment toxicity testing;

collecting sediments in Creek Sectors B to F, M, and the reference areas for benthic community analysis.

Please refer to the QAPP/FSP for details of field sampling, number of stations, and station locations, and analytical methods.

## 2.0 SITE CONCEPTUAL MODEL

## 2.1 Ecological Observations

We will conduct a reconnaissance survey to provide more details and more current information regarding ecological conditions at the various creek sectors. This section provides a description of the site as observed on 29-30 July 1996, when Menzie-Cura & Associates, Inc. personnel (David Peterson, Certified Wildlife Biologist), visited the Sauget Area 1 in Sauget and Cahokia, Illinois and conducted an evaluation of local habitats. The areas observed at that time included ecological resources along: Dead Creek, Prairie du Pont Creek, the associated wetlands, Cahokia Chute, and the Mississippi River. In addition, we contacted federal/state agencies and private conservation organizations concerning additional ecological information available about the area (see Attached List).

Potentially sensitive environments in the Dead Creek area include: Habitat Known to be Used by Federal Designated or Proposed Endangered or Threatened (T/E) Species, Habitat Known to be Used by State Designated Endangered or Threatened Species, and Wetlands.

Habitat Known to be Used by Federal Designated or Proposed Endangered or Threatened Species

According to the records of the Illinois Department of Natural Resources' Natural Heritage Inventory, the only federally endangered or threatened species in the study area is the federally threatened bald eagle (Haliaeetus leucocephalus). In 1993, a pair of eagles unsuccessfully attempted to nest at the southern tip of Arsenal Island, where the ditched portion of Prairie du Pont Creek enters the Mississippi River. The pair apparently was scared off the site. The next year the pair returned to the island, but no monitoring was conducted to determine if they successfully nested. During the late July 1996 survey we did not observe any eagles in the study area. Remains of a large stick nest were observed at the southern tip of Arsenal Island, but it did not appear to have been used during 1996. We will also check the State of Missouri files for State Designated Endangered or Threatened Species.

Portions of the area suitable for eagle foraging include waterbodies large enough to support large fish such as carp and catfish. The Mississippi River, the channelized section of Prairie du Pont Creek, and a borrow pond at the lower end of Dead Creek all appear to support large fish and provide enough open water for eagles to fish. No foraging eagles were observed during the site visit, nor have local people in the area seen eagles in the vicinity.

Habitat Known to be Used by State Designated Endangered or Threatened Species

The Illinois Natural Heritage Inventory did not have any records of state-listed endangered or threatened species in the study area. However a number of state-listed wading birds were observed throughout the wetlands and waterways. Illinois endangered species observed were

little blue heron (Egretta caerulea), snowy egret (Egretta thula)<sup>1</sup>, and black-crowned night heron (Nycticorax nycticorax). Great egret (Casmerodius albus), an Illinois threatened species, was also observed. Small numbers (one to ten individuals) of these wading birds were found foraging along sections of Dead Creek, the ditched length of Prairie du Pont Creek, Cahokia Chute, and the Mississippi River. The largest concentrations of foraging herons (approximately ten individuals at a location) were observed at the confluence of Dead Creek and the ditched Prairie du Pont Creek, and where the ditched Prairie du Pont flows into the Mississippi. These areas likely support the best concentrated fishing areas for wildlife along the waterways.

No wading bird colonies were located within the study area. However, the Illinois Natural Heritage Inventory has documented two 1000-2000 nest mixed-species colonies in East St. Louis. The closest of these two colonies is approximately one mile east of the Monsanto plant near the Alton & Southern rail yards in Alorton. The second site is over two miles to the north at Audubon Avenue and 26th Street. These two colonies contain the only breeding little blue heron and snowy egret in Illinois. In addition, black-crowned night heron, great egret, cattle egret (Bubulcus ibis), great blue heron (Ardea herodias), and green-backed heron (Butorides virescens) nest in the colonies.

In 1988, because the region is heavily industrialized with numerous Superfund sites, the U.S. Fish & Wildlife Service (USFWS) collected black-crowned night heron and little blue heron eggs from the Alorton colony for contaminant analysis (Young, 1989 - unpublished draft). Sediment samples were also taken in areas of observed wading bird foraging around the East St. Louis region. No testing was done of sediments in the Dead Creek drainage. PCB's, DDE, and metals were detected at varying levels from the wading bird eggs.

The observed endangered and threatened wading birds forage on a wide range of aquatic organisms, such as fish, frogs, and crayfish, as well as some terrestrial species such as reptiles and insects. The USFWS study found that wading birds forage over a wide area around East St. Louis. The Dead Creek/Prairie du Pont wetlands system composes a relatively small percentage of the available wetland foraging area in the region.

#### Wetlands

Wetlands in the study area consist of riparian woods, shrub swamp, marsh, and wet meadow located adjacent to the area's waterways. Drainage from much of the industrial area at the head of Dead Creek is routed away from the Dead Creek drainage via the local municipal sewer system. Dead Creek begins south of an industrial zone adjacent to the Cerro property and flows slowly south through residential neighborhoods. The stream is bordered by a dense, narrow band of riparian trees and shrubs, including cottonwood, willow, mulberry, and box elder (Photo B-1). Homeowners have cleared to the creek's edge and have established lawn along several sections. Within the residential area (east of Route 3) the stream is crossed, via

<sup>&</sup>lt;sup>1</sup> Also endangered in Missouri.

culverts, by seven roads. At the Judith Lane road crossing, the road culvert has been set approximately one foot higher than the observed water level, apparently to allow drainage of the channel only during high-water events. The pooled channel behind this road is connected to a small pond located at the end of Walnut Street where herons, painted turtle, wood duck, fish, and evidence of beaver (chewed trees, see Photo B-2) were observed (see Table B-1).

Downstream of the impounded channel, Dead Creek segments C and D flow south through bordering wetlands (Photo B-3, note Green Backed Heron in center of photograph). For a short section, adjacent to Parks College, the creek is routed through a culvert under a parking area. Throughout the rest of the creek's length it is bordered by either riparian vegetation (Photo B-4) or lawn (Photo B-5). Emergent and aquatic vegetation occurs along the creek's shores. Wildlife observed in and adjacent to the stream included herons, turtles, songbirds, squirrel, and raccoon. Small fish and frogs were observed throughout the creek's length.

West of Route 3, the creek flows south and west through the American Bottoms floodplain. This area contains active and abandoned agricultural land divided by levees and railroad right-of-ways. After crossing Route 3 Dead Creek flows under a railroad right-of-way and is joined by a stream draining land from the north. North of the confluence of these two waterways is a road that cuts SE to NW across the floodplain, connecting Cahokia to Fox Terminal. To the north (upstream) of this road is a gas tank farm and fields. The stream was observed to flow south under the Fox Terminal road and into Dead Creek. A second dry culvert was observed west of the stream crossing in the vicinity of the north end of the Dead Creek borrow pond. This culvert appeared to drain the land north of the Fox Terminal road during high-water events when water from the tank farm and surrounding area becomes impounded behind the roadway.

Downstream of the confluence of the two waterways, Dead Creek flows through riparian woods and shrubs and into a borrow pond. The pond appears to have been excavated during the construction of the local levee system. The United States Geological Survey (USGS) map of the area (Cahokia) indicates that the pond was dug to its current shape sometime after 1954. The pond is the largest non-flowing water body in the area. Its shore is surrounded with mature riparian trees and emergent wetland vegetation. Ducks, herons, and fish were observed in the pond.

Dead Creek forms the outlet of the pond, draining south through a pump station under the levee (Photo B-6) and into the ditched section of Prairie du Pont Creek. At the confluence and above it (Photo B-7) the ditch shore is vegetated with grasses, herbs, and small shrubs. The channel flows northwest to Arsenal Island on the Mississippi River. Arsenal Island contains areas of mature riparian woods and agricultural fields. The shoreline of the lower end of the ditch (referred to on the USGS map as Cahokia Chute) is lined with riparian woods, principally large cottonwoods and willow (Photo B-8). Large catfish, wood duck, wading birds, and turtles were observed in the channel. Cahokia Chute forms the eastern border of Arsenal Island. The waterway flows north to south, draining the region northeast of the island. It appears that during times when the Mississippi River is high, the River uses the Chute channel to flow around Arsenal Island. Any water from the Dead Creek watershed

therefore only flows through the lower half of the Cahokia Chute between the confluence with the ditched Prairie du Pont and the Mississippi River. The remains of the bald eagle nest and congregating wading birds were observed at the southern tip of Arsenal Island, where the Chute flows into the Mississippi.

Almost the entire length of the Dead Creek study area is bordered by wetlands. Most of the wetlands are confined to a narrow riparian strip adjacent to the Creek. More extensive wetlands occur west of Route 3, particularly in the vicinity of the borrow pond. The Creek's wetlands appeared healthy with no evidence of ecological stress (no chlorotic plants, no nonspecific stands of vegetation, no areas of dying or dead vegetation, observable presence of diverse pelagic communities in the stream, no observed surface water sheens or sediment staining). The wetlands also appeared to support a diverse aquatic and terrestrial wildlife community, with abundant prey species (i.e. fish, frogs, turtles) and predatory species (i.e. wading birds, waterfowl, raccoons) present. The wetlands west of Route 3 receive water from both Dead Creek and from drainages to the north, including the area around the gas tank farm.

### Summary

During the field survey and subsequent contact with state and federal agencies, three categories of sensitive environments were located in the Monsanto/Dead Creek area: Habitat Known to be Used by Federal Designated or Proposed Endangered or Threatened Species, Habitat Known to be Used by State Designated Endangered or Threatened Species, and Wetlands. These three categories are interrelated with the rare species documented all utilizing wetland/waterway habitats. The rare species observed forage over a wide area, with the Dead Creek watershed forming only a small part of their available feeding territory.

The Dead Creek watershed also appears to support a diverse plant and animal community. While much of the Creek flows through residential neighborhoods, sufficient natural riparian vegetation remains to support local aquatic and terrestrial communities. No evidence of ecological stress was evident in the upper Creek, nor anywhere else along the waterway's path to the Mississippi.

### 2.2 Site Conceptual Model

The foundation of an ERA work plan is the site conceptual model. It integrates information from the preliminary observations at the site (usually incorporated into the screening level risk assessment). According to EPA guidance, the conceptual model addresses:

environmental setting and contaminants known or suspected to exist at the site; contaminant fate and transport mechanisms; mechanisms of ecotoxicity and likely categories of potentially affected receptors; complete exposure pathways.

Figure 1C-1 provides a Preliminary Conceptual Model diagram. It illustrates potential contaminant transport from the contaminated media through the potentially affected habitats to important ecological receptors. We will revisit and, if necessary, amend this model after completion of the site reconnaissance survey.

The site conceptual model is consistent with our knowledge of the area to date as described in our 1996 survey and in the recent EPA Preliminary Risk Assessment.

Environmental Setting and Contaminants Known Or Suspected To Exist At The Site

Subsection 2.1 describes the environmental setting. The EPA Preliminary Ecological Risk Assessment describes the contaminants known or suspected to be at the site. The environmental setting is an aquatic environment with extensive wetlands, riparian woods, narrow, shallow streams, broader semi-impounded basins, and floodplain.

The likely contaminants include those addressed in the EPA assessment:

metals (arsenic, barium, cadmium, chromium, lead, mercury);

PCBs:

PAHs:

dioxin.

The eventual execution of the QAPP/FSP will analyze for a broader list of potential contaminants in sediments, surface water, and biota. We will evaluate those data within the baseline risk assessment and add contaminants as appropriate based on: frequency of occurrence within a particular media, likely bioavailabilty, evidence for bioaccumulation, toxicity to likely receptors, and comparison of concentrations to a reference area. Obviously, the addition of more contaminants of concern may require changes in the conceptual model for the baseline risk assessment depending upon the fate, transport, and biological properties of these contaminants. The EPA guidance recognizes and encourages this iterative process.

### Contaminant Fate and Transport Mechanisms

In an aquatic system such as occurs over Dead Creek Sectors B through F, and M, various physical, chemical, and biological transport mechanisms will affect the fate of contaminants. All the contaminants listed in the EPA Preliminary Assessment adhere to particulate matter to varying degrees. Therefore, the conceptual model should address those mechanism affecting particle distribution in aquatic systems. These include:

particulate runoff from the watershed,
deposition in areas of sluggishly flowing waters,
erosion in faster moving stream segments, and
resuspension of particulates from the stream bed and over the floodplain.

Chemicals with lower particle affinities may be more subject to dissolution in and transport by surface water. Increasing solubility generally correlates with increasing bioavailability. In particular, various metals on the preliminary list of contaminants are subject to transport in soluble form, depending on their valence states.

The major biological mechanisms affecting fate and transport are:

biological uptake directly from environmental media; and,

bioaccumulation through ingestion of prey or media;

biomagnification through the food chain.

Several of the contaminants are subject to one or all of these biological fate and transport mechanisms.

The baseline risk assessment will describe each contaminant of concern (including any added after the next sampling rounds) in terms of the transport mechanisms most likely to affect it. The EPA Preliminary Risk Assessment provides a description of the likely transport mechanisms for each of the contaminants or classes of contaminants listed.

Mechanisms of Ecotoxicity And Likely Categories Of Potentially Affected Receptors

The EPA Preliminary Risk Assessment summarizes the ecotoxicological properties of the potential contaminants in sufficient detail to develop the first iteration of the conceptual model. As indicated in the summaries, the various contaminants may affect the survival and reproductive capacity of benthic biota, fish, invertebrates, vascular plants, and algae.

The baseline risk assessment will provide detailed ecotoxicity profiles for the final list of contaminants of concern. These will include summaries of the toxicity of these chemicals to receptors likely to occur in the Dead Creek environment (insofar as these exist), and a selection of the most appropriate toxicity factor to use in the baseline risk assessment.

The categories of likely potentially affected receptors for an aquatic system such as the Dead Creek, Sectors B through F, and M include:

The benthic macroinvertebrate community;

warm water fish (e.g., largemouth bass);

waterfowl (e.g. mallard) that feed on plants and macroinvertebrates (including crayfish); piscivorous birds (e.g., great blue heron, bald eagle);

aquatic mammals (e.g. muskrat) that feed on plants and macroinvertebrates (including crayfish);

aquatic mammals (e.g., river otter or racoon) that feed on fish and macroinvertebrates (including crayfish).

There is also some potential for exposure to terrestrial plants and wildlife from exposure to contaminants in soil or through exposure to soil based food chains.

### Complete Exposure Pathways

The USEPA guidance indicates that the risk assessment must identify complete exposure pathways before a quantitative evaluation of toxicity to allow the assessment to focus on those contaminants that can reach ecological receptors. The likely complete exposure pathways in Dead Creek, Sectors B through F, and M are:

sediment to benthic invertebrates via direct contact and ingestion;

sediment and surface water to aquatic plants via uptake;

surface water to invertebrates and fish though direct contact and ingestion;

benthic biota (including crayfish) to higher order predators (e.g. fish) through food chain;

forage fish and crayfish to piscivorous fish, mammals, or birds;

soil to soil invertebrates along the creek banks or floodplain;

soil to plants or wildlife along the creek banks or floodplain.

### 3.0 SELECTION OF CHEMICALS OF ECOLOGICAL CONCERN (COECs)

As indicated in subsection 2.2, the USEPA Preliminary Risk Assessment provides an initial list of contaminants of ecological concern (COECs). The QAPP/FSP includes target analytes beyond these initial COECs. These target analytes include: VOCs, metals, SVOCs, PCBs, and pesticides.

The baseline risk assessment will re-evaluate the COEC list based in the results of the proposed sampling and analysis of surface water, sediment, and biota. The criteria for final selection include:

Comparison to Background – the baseline risk assessment will eliminate a contaminants which occurs below the maximum concentration measured at a local reference area for a given medium;

Frequency of Detection – the baseline risk assessment will retain a contaminant detected in more than 5% of samples for a particular media.

For those compounds which exceed background and/or are frequently detected in a particular medium, the baseline risk assessment will add them to the final list of COECs if they exhibit any of the following characteristics:

Toxic - exhibit toxicity (based on scientific literature) to the receptors likely to occur along the Dead Creek, Sectors B through F and M, or adjacent habitats;

Bioaccumulative – are likely to bioconcentrate or biomagnify through the food chains represented in Dead Creek, Sectors B through F, and M, and adjacent habitats;

Persistent – are likely to remain in environmental media over time frames that are long relative to the life spans or exposure periods of receptors likely to occur in Dead Creek, Sectors B through F, and M, and adjacent habitats.

The ERA will include a current review of toxicological information for all COECs on the final list. Where available, this information will include toxicity benchmarks that are applicable to water and sediments.

### 4.0 IDENTIFICATION OF RECEPTORS, ASSESSMENT ENDPOINTS, AND MEASURES OF EFFECT

### 4.1 Receptors

This subsection of the ecological risk assessment identifies the receptors (receptor species) and provides the rationale for their selection as representative of the species that occur or are likely to occur near the site. This subsection also provides an ecological characterization of each receptor for eventual use in developing the exposure assessment.

The selected receptors represent those types of organisms most likely to encounter the contaminants of concern at the site. They include a reasonable (although not comprehensive) cross-section of the major functional and structural components of the ecosystem under study based on:

relative abundance and ecological importance within the selected habitats; availability and quality of applicable toxicological literature; relative sensitivity to the contaminants of concern; trophic status; relative mobility and local feeding ranges; ability to bioaccumulate contaminants of concern.

The selected species represent different feeding guilds. This representative species approach for assessing exposures for wildlife is a common practice for assessing risk. A guild is a group of animals within a habitat that use resources in the same way. Coexisting members of guilds are similar in terms of their habitat requirements, dietary habits, and functional relationships with other species in the habitat. Guilds may be organized into potential receptor groups. The use of the guild approach allows focused integration of many variables related to potential exposure. These variables include characteristics of COECs (toxicity, bioaccumulation, and mode of action), and characteristics of potential receptors (habitat, range and feeding requirements, and relationships between species). This approach evaluates potential exposures to all animals by considering the major feeding guilds found in a habitat. It is assumed that evaluation of the potential effects of COECs to the representative species will be indicative of the potential effects of COECs to individual member classes of organisms within each feeding guild.

The selected species represent the ecological community and its sensitivity to the contaminants of concern. They are: benthic invertebrates, shellfish, local fin fish, great blue heron, mallard, bald eagle, muskrat, and river otter or raccoon.

### Benthic invertebrates

Benthic invertebrates are potential receptor species in Dead Creek because they:

have the greatest exposure to sediments;

provide food for bottom-feeding fish species (in the river);

are relatively immobile (sessile) in habit, and therefore their general health and condition reflects local conditions:

### Warm Water Fish Species

Warm water resident fish species were selected to reflect local sediment and water quality conditions. The typical warm water fish species such as centrachids (sunfish, bass) and bottom feeding fish such as bullheads are likely and abundant local resident with a limited foraging range. These organisms are potential receptor species representing local fish because they are:

resident in this reach of the Dead Creek:

exposed to sediments as well as surface water,

represent forage fish and higher order predators feeding on smaller fish and invertebrates.

#### Aquatic Birds

We have selected great blue heron, mallard duck, and bald eagle to represent aquatic birds feeding in Dead Creek, Sectors B through F, and M for at least a portion of the time.

Great Blue Heron (Ardea herodias)

The great blue heron inhabits salt and freshwater environments, typically shallow waters and shores of lakes, flooded gravel pits, marshes and oceans. In marsh environments, the great blue heron is an opportunistic feeder; they prefer fish, but they will also eat amphibians, reptiles, crustaceans, insects, birds, and mammals. The diet varies but may include up to 100% fish. A Nova Scotia study found 6% forage fish (Atlantic silverside and mummichog), 52.6% eels, and 41.4% other fish in the diet of great blue heron (USEPA, 1993). A food ingestion rate for adult breeding birds of 0.18 g food/g body weight/day has been reported.

Great blue heron tend to forage near nesting sites (USEPA, 1993). A study in Minnesota measured the distance between nesting and foraging grounds to range from 0 to 2.7 miles. A Carolina study found the same distance to be 4 to 5 miles. The maximum distance great blue heron will fly between foraging areas is 9 to 13 miles (USEPA, 1993). The size of the feeding territory in a freshwater area in Oregon was 1.5 acres, while the feeding territory in an estuarine area was 21 acres.

These organisms are potential receptor species because they:

Consume near shore fish;

Have a foraging range about equal to the downstream area of the Dead Creek sectors;

Are a higher trophic level predator in the creek and Mississippi.

Great blue heron, therefore, represent piscivorous birds in this reach of the river.

Mallard (Anas platyrhynchos)

The mallard is the most common freshwater duck of the United States, found on lakes, rivers, ponds, etc. It is a dabbling duck, and feeds (usually in shallow water) by "tipping up" and eating food off the bottom of the water body. Primarily, it consumes aquatic plants and seeds (for instance, primrose willow and bulrush seeds), but it will also eat aquatic insects, other aquatic invertebrates, snails and other molluscs, tadpoles, fishes, and fish eggs. Ducklings and breeding females consume mostly aquatic invertebrates. The mallard's home range is variable, but an approximate range is 500 hectares. It prefers to nest on ground sheltered by dense grass-like vegetation, near the water.

Mallards are a potential receptor species because they:

Consume both aquatic plants and aquatic invertebrates;

Live on or near the water;

Are a lower trophic level duck in the creek and in Mississippi.

Mallards, therefore, represent waterfowl in this reach of the river.

Bald Eagle (Haliaeetus leucocephalus)

Bald eagles are generally found in coastal areas, near lakes or rivers. Their preferred breeding sites are in large trees near open water. They are usually found in areas with minimal human activity.

Bald eagles, although primarily carrion feeders, are opportunistic and will eat whatever is plentiful including fish, birds, and mammals. Reported food ingestion rates range from 0.064 to 0.14 g/g/day. A study of adult breeding bald eagles in Connecticut estimated a food ingestion rate of 0.12 g/g/day (USEPA, 1993). A study of bald eagle diets in Maine indicated that their diets consisted of 76.7% fish, 16.5% birds, and 6.8% mammals (USEPA, 1993).

Foraging areas vary according to season and location. The USEPA (1993) reports a foraging length of 2 to 4.5 miles along a river.

These organisms are potential receptor species because they:

Consume fish;

Are a higher trophic level predator in the river;

Are sensitive to contaminants that biomagnify in the food chain.

The bald eagle, therefore, represents predatory birds in these sectors of Dead Creek.

### Aquatic Mammals

This assessment assumes that either river otter (or racoon if the site reconnaissance indicates that otter are unlikely to occur in the area) and muskrat represent aquatic mammals in Dead Creek sectors B through F.

River Otter (Lutra canadensis)

The river otter can be found in primarily freshwater but also saltwater environments, but seems to prefer flowing-water habitats rather than still water. It has been found in lakes, marshes, streams, and seashores. It consumes largely fish, but is opportunistic and will consume aquatic invertebrates (crabs, crayfish, etc.), aquatic insects, amphibians, birds (e.g. ducks), small or young mammals, and turtles. They may also sift through sediment for food. The otter dens in banks, in hollow logs, or similar burrow-like places. Home range varies depending on habitat and sex, but an approximate measure is 300 hectares.

River otters are a potential receptor species because they:

Consume fish and aquatic invertebrates;

Live in or near the water.

Are a higher trophic level predator in the creek and in Mississippi.

River otters, therefore, represent higher trophic level aquatic mammals in this reach of the river.

Raccoon (Procyon lotor)

The raccoon is likely to be present because the creek and surrounding areas consist of its most preferred types of habitat (marshes and suburban residential areas). Because the raccoon is an omnivore, it is likely to experience greater exposure to than the muskrat which is primarily a herbivore. The raccoon is known to consume aquatic invertebrates (such as crayfish), fish, insects, mollusks, annelids, bird eggs, small passerine birds, small mammals such as squirrels, and plants (Chapman and Feldhamer, 1990).

Raccoon are a potential receptor species because they:

Consume fish and aquatic invertebrates;

Live near the water;

Are a higher trophic level predator in the creek and in Mississippi.

Raccoon, therefore, represent higher trophic level aquatic mammals in this reach of the river.

Muskrat (Ondatra zibethicus)

The muskrat is a semiaquatic large rodent which lives near freshwater and brackish aquatic environments: marshes, ponds, creeks, lakes, etc. It feeds largely on aquatic plants, but depending on location and time of year may also consume aquatic invertebrates (crayfish, crabs, etc.), small amphibians, turtles, fish, molluscs, and even young birds. The muskrat lives quite close to the water, either on the bank of the water body or constructing a lodge in the water body. Its home range is small (0.17 hectares on average) and one study found that muskrats remain within 15 meters of their primary dwellings 50 percent of the time.

Muskrats are a potential receptor species because they:

Consume aquatic plants and aquatic invertebrates;

Live on or near the water:

Are a lower trophic level omnivore in the creek and in Mississippi.

Muskrats, therefore, represent lower trophic level aquatic mammals in this reach of the river.

Soil invertebrates

Soil invertebrates are potential receptor species in Dead Creek banks and floodplain because

they:

have the greatest exposure to soil;

provide food for birds and mammals (in the river);

are relatively immobile (sessile) in habit, and therefore their general health and condition reflects local conditions;

### 4.2 Assessment Endpoints

Assessment endpoints are expressions of the environmental value to be protected at a site. Assessment endpoints are often not directly measurable. Therefore, assessment employs measures of effects. These are biological or measurable ecological characteristics which reflect the assessment endpoint (USEPA, 1997). Where the assessment endpoint is not directly measurable, the use of a measure of effect may result in some uncertainty in the risk characterization. Ultimately, the selection of assessment endpoints requires the consensus of the regulators, the regulated community, and state or local concerns. This work plan proposes the following assessment endpoints for the potentially-affected aquatic receptors and their habitats:

Sustainability (survival, growth, and reproduction) of warm water fish species typical of those found in similar habitats (incorporates the assessment of benthic macroinvertebrates and crayfish);

Survival, growth, and reproduction of local populations of aquatic wildlife represented by bald eagles, mallard duck, great blue heron, muskrat, and river otter or raccoon (incorporates the assessment of benthic macroinvertebrates and crayfish).

The assessment will evaluate risk relative to these assessment endpoints in Creek, Sectors B through F and M, collectively and individually, based on prior observations and the work proposed in the QAPP/FSP.

### 4.3 Selection of Measures of Effects

The measures of effect direct data collection needs for the baseline ecological risk assessment. They provide the actual measurements for estimating risk. A weight-of-evidence approach (Menzie et al., 1996) weighs each of the measures of effects by considering:

strength of association between the measure of effects and assessment endpoint; data quality; and study design and execution.

Strength of association refers to how well a measure of effects represents an assessment endpoint. The greater the strength of association between the measurement and assessment

endpoint, the greater the weight given to that measure of effect in the risk analysis.

The weight given a measure of effect also depends on the quality of the data as well as the overall study design and execution. The QAPP/FSP describes a sampling program that will provide information adequate for evaluating each selected measure. However, the risk assessment must evaluate the performance of the sampling effort and the variability and uncertainties associated with the results following implementation. The risk characterization gives higher weight to measures of effect that are based on good quality data and are obtained using study designs that account for confounding variables.

There is considerable uncertainty associated with estimating risks, because ecological systems are complex and exhibit high natural variability. Measures of effects typically have specific strengths and weaknesses related to the factors discussed above. Therefore, it is common practice to use more than one measure of effect to evaluate each assessment endpoint. This subsection describes the measures of effects and how the baseline risk assessment will use them to evaluate risks for each of the assessment endpoints.

## TABLE 1 ASSESSMENT ENDPOINTS AND ASSOCIATED MEASURES OF EFFECTS

### Assessment Endpoint 1: Sustainability of warm water fish in Creek Sector F

Measure of effect 1a: body burdens of COECs in selected fish species as a measure of exposure (compared to body burdens in fish from reference areas) and effects (compared to benchmark values).

Measure of effect 1b: COEC concentrations in surface waters as compared to applicable water quality criteria for protection of fish and wildlife.

Measure of effect 1c: sustainability of a benthic macroinvertebrate community that can serve as a prey base for fish:

Concentration of COECs in sediment:

Field assessment of benthic macroinvertebrate community structure (using EPA Rapid Bioassessment Protocol I, as described in Rapid Bioassessment Protocols for Use in Streams and Rivers, Benthic Macroinvertebrates and Fish, EPA/444/4-89-001.

Sediment toxicity tests.

Assessment Endpoint 2: Survival, growth, and reproduction of local populations of aquatic wildlife as represented by the bald eagle, mallard duck, great blue beron, muskrat, and river otter or raccoon in Creek Sectors B through F, and M

Measure of effect 2a: Wildlife species composition and habitat use.

Measure of effect 2b: Concentration of semi-volatile compounds (SVOCs), metals, mercury, Polychlorinated Biphenyls (PCBs), pesticides, cyanide, herbicides, and dioxin in aquatic and marsh plants for use in evaluating exposure via the food chains for mallard duck, river otter or raccoon, and muskrat.

Measure of effect 2c: Concentration of COECs in surface waters in comparison to wildlife benchmarks.

Measure of effect 2d: Concentration of COECs in forage fish and crayfish for use in evaluating exposure via the food chain for great blue heron and river otter or raccoon.

Measure of effect 2e: Concentration of SVOCs, metals, mercury, PCBs, pesticides, cyanide, herbicides, and dioxin in macroinvertebrates (including crayfish) for use in evaluating exposure via the food chain for mallard duck, river otter or raccoon and muskrat.

Measure of effect 2f: sustainability of a benthic macroinvertebrate community that can serve as a prey base for fish (includes three lines of evidence as in Assessment Endpoint 1).

Assessment Endpoint 3: Survival, growth, and reproduction of individuals within the local bald eagle population in Creek Sectors B through F, and M

Measure of effect 3a: Concentration of COECs in fish for use in evaluating exposure via the food chain.

Assessment Endpoint 4: Survival, growth, and reproduction of local populations of terrestrial wildlife along the banks and floodplain of Creek Sectors B through F, and M

Measure of effect 4a: Soil screening effect levels for the protection of wildlife, plants, and soil dwelling invertebrates.

### 4.3.1 Measures of Effects for Assessment Endpoint 1, Sustainability of Warm Water Fish

The COECs may exert direct effects on warm water fish through exposure in the water, sediment, or prey, and indirectly by affecting their prey, the macroinvertebrate community. The proposed measures of effects assess exposure pathways and potential effects. Some rely upon direct observations of conditions; some involve measures of toxicity; and others use literature values.

### Measure of effect 1a: body burdens of COECs in selected fish species.

Purpose and Rationale. Fish exposed to bioaccumulative compounds in their diet or in water can accumulate these COECs in their tissues. Contaminants tend to accumulate in organs such as the liver and kidney to a greater degree than in the musculature. However, COEC levels in the muscle tissue and on a whole body basis are useful for evaluating risks to animals that eat fish. The assessment will use measurements of COECs in fish tissues to evaluate exposure and effects on the fish, and to provide data for use in other parts of the assessment.

Approach. The assessment will use this endpoint to evaluate exposure and effects. As a measure of exposure, it will compare body burdens of COECs in small forage fish, medium bottom-feeding fish and large piscivorous fish to those same fish species in the reference area. Therefore, the comparisons of fish body will help to assess if fish in Dead Creek are exposed to COECs in excess of those that occur in the reference area. The assessment will also use the body burden data as input to the food chain exposure models for the representative piscivores (the great blue heron, bald eagle, and the river otter or raccoon).

As a measure of effects, the assessment will compare measured body burdens to literature values at which effects have been reported. The Waterways Experiment Station (WES) of the Army Corps of Engineers provides an on-line database and The Society of Environmental Toxicology and Chemistry (Jarvinen and Ankley, 1999) provides a compilation of such residue effect levels. The assessment will query these databases. If body burdens exceed levels at which effects have been reported in the databases, it will be presumed that the measure of effect indicates the potential for effects in the selected fish species found in Dead

#### Creek.

Measure of effect 1b: COEC concentrations in surface waters as compared to applicable water quality criteria for protection of fish and wildlife.

Purpose and Rationale. Water concentrations provide a measure of exposure, and water quality criteria indicate levels above which effects may occur. This measure of effect will evaluate the potential for water concentrations of COECs in Dead Creek to cause adverse effects.

Approach: The assessment will compare measured concentrations of dissolved metals in surface waters to water quality criteria. Exposure of individual fish and the populations of fish in water will partly depend on the exposure field and the distribution and behavior of the fish. Thus, the area over which water quality criteria are exceeded becomes an important consideration when evaluating exposure. We will evaluate effects with respect to spatial extent and degree to which surface water concentrations exceed water quality criteria.

The USEPA has published an ECO-UPDATE entitled: "Ecotox Thresholds" that includes COEC-specific water quality benchmarks. If an Ecotox Threshold value is available for a COEC, the concentration of the COEC in water will be compared to its respective Ecotox Threshold value. When specific benchmarks are not available and when appropriate, USEPA has suggested using appropriate extrapolations between related species.

### Measure of effect 1c: Sustainability of benthic macroinvertebrate communities that comprise a prey base

Purpose and Rationale. Benthic macroinvertebrates are an important source of food for many fish species. They experience direct sediment exposures due to their life histories. Exposures that result in reduced abundance, diversity, or biomass of these aquatic macroinvertebrates, could indirectly effect fish populations. Further, quantitative studies of benthic macroinvertebrates have a long history of use in water quality studies.

The assessment will use the sediment triad approach as part of a weight-of-evidence analysis to evaluate the sustainability of benthic macroinvertebrate communities in these water bodies. The sediment triad approach evaluates three elements of a benthic community:

field assessment of benthic macroinvertebrates;

sediment chemistry measurements;

sediment toxicity testing using indicator benthic macroinvertebrates.

Field assessment of benthic macroinvertebrate community

Effects will be evaluated by comparing the composition and abundance of benthic

macroinvertebrates within Dead Creek at different levels of concentrations of COECs in sediments (generally following EPA Rapid Bioassessment Level I Protocols in the field). These comparisons will help to estimate if there is a level above which effects are evident. Data from the reference areas will help to support the assessment because these reflect conditions in water bodies unaffected by site contaminants. If there are observable reductions in the abundance of benthic macroinvertebrates, we will assess the significance of this for the fish species that rely upon the macroinvertebrates for food as this is the basis for the assessment. This will be accomplished by relating the abundance and biomass of benthic macroinvertebrates to their production, and ultimately to the potential production of fish, using available production:biomass ratios from the literature.

### Sediment chemical measurements

Concentrations of COECs in sediment will be compared to sediment benchmarks to judge whether adverse biological effects to benthic macroinvertebrates are plausible. The USEPA compares sediment chemical measurements to Effect Range-Low (ERL) values and Effect Range-Median (ERM) values (Long and Morgan, 1990). However, sediment concentrations which exceed ER-Ls and/or ER-Ms do not necessary indicate that adverse effects to benthic macroinvertebrates have occurred. The USEPA's sediment triad approach uses multiple lines of evidence to assess if benthic macroinvertebrates are adversely affected by sediment-associated contaminants.

The USEPA has published an ECO-UPDATE entitled: "Ecotox Thresholds" that includes COEC-specific sediment benchmarks. If an Ecotox Threshold value is available for a COEC, the concentration of the COEC in sediment will be compared its respective Ecotox Threshold value. When specific benchmarks are not available and when appropriate, USEPA has suggested that appropriate extrapolations between related species can be used.

### Sediment toxicity testing

The assessment will use laboratory sediment bioassays conducted on sediments from Dead Creek and the reference area to evaluate the potential effects of whole sediment on representative benthic macroinvertebrates. The toxicity of the sediment will be compared to that of the standard control sediment used by the laboratory as part of the laboratory's standard operating procedures. Statistically significant decreases in survival and/or growth relative to controls will be considered a COEC-related effect when they can be related to exposures associated with COECs in the sediments.

### 4.3.2 Measures of Effects Associated with Assessment Endpoint 2

Survival, growth, and reproduction of local populations of aquatic wildlife populations represented by bald eagles, mallard duck, great blue heron, muskrat, and river otter or racoon (incorporates the assessment of benthic macroinvertebrates)

The assessment will use six measures of effects (some species-specific) to evaluate risks to the wildlife assessment endpoint. Food-chain modeling will estimate exposure to the four wildlife species.

Wildlife either sighted during prior site visits or likely to occur based on the evaluation of habitats was used to identify representative wildlife species.

Table 2. Representative Aquatic Wildlife Species Proposed for Assessing Risks of COECs to Wildlife.

Species	Feeding Guild	Primary Habitat	Use in ERA
Bald Eagle	Eats fish and other small animals	Aquatic	Evaluate exposure to COECs in aquatic food webs
Great Blue Heron	Eats fish and other small animals	Aquatic	Evaluate exposure to COECs in aquatic food webs
Mallard Duck	Eats plants and macroinvertebrates	Aquatic	Evaluate exposure to COECs in aquatic plants and macroinvertebrates
Muskrat	Eats plants and some macroinvertebrates (e.g., clams)	Aquatic	Evaluate exposure to COECs in aquatic plants and in macroinvertebrates
River otter or	Eats fish, other small animals and some macroinvertebrates	Aquatic	Evaluate exposures to COECs in fish and macroinvertebrates

The assessment will use exposure models to evaluate different routes of exposure including ingestion of water, sediment and food (plants, benthic macroinvertebrates and fish). This subsection describes the measures of effects and the general model used to evaluate exposures.

### Measure of effect 2a: Wildlife species composition and habitat use.

Purpose and Rationale. The measure of effect directly examines the receptors – wildlife – to estimate if they are using the various sectors of Dead Creek. The assessment is a measure of the degree to which local and migratory wildlife use the habitat and the extent to which it supports their needs.

Approach: The assessment will compare the composition and habitat use by wildlife to observations of species composition of wildlife and their use of a reference area. A wildlife biologist will make these observations This type of survey is qualitative. The strength of the

analysis is that it indicates whether Dead Creek can support wildlife species comparable to unaffected reference areas. However, because of the qualitative nature of the observations and the high natural variability that can exist in wildlife populations, direct observations may not reveal effects.

### Measure of effect 2b: Concentrations of COECs in aquatic and marsh plants.

This measure of effect will be conducted within Dead Creek Segments B to F, and M and the reference areas.

This plan recommends collecting aquatic and marsh plants for analysis of COECs because some species of wildlife using Dead Creek and wetlands eat aquatic and marsh plants. This is a potentially complete exposure pathway for wildlife. The QAPP/FSP describes the details of the aquatic and marsh plant collection and analysis.

Purpose and Rationale. The assessment will compare measures of COECs in submerged aquatic and emergent marsh vegetation within Dead Creek and a reference water body. Waterfowl graze on aquatic plants. Herbivorous mammals such as the muskrat eat aquatic and emergent vegetation in wetlands. If plants take up metals and PAHs from the water or sediments, waterfowl and herbivorous mammals could be exposed to these COECs in their diet.

As the QAPP/FSP indicates, fruiting bodies/leaves and roots from aquatic plants and emergent plants will be composited separately.

Approach: The endpoint will be evaluated in multi-pathway exposure models for the mallard and the muskrat that considers sediment, water, and food. Exposures to water fowl and herbivorous mammals within the Dead Creek sectors will be compared to: 1) appropriate NOAEL and LOAEL values, and 2) exposures that occur in reference areas. The COEC concentrations measured in submergent aquatic plants will be used to evaluate potential dietary exposures to the mallard, which graze on aquatic plants. The COEC concentrations measured in submergent and emergent plants will be used to evaluate potential dietary exposures to the muskrat, which graze on greens.

### Measure of effect 2c: Concentration of COECs in surface waters.

Purpose and Rationale. Many wildlife species will use Dead Creek and associated wetlands as a drinking water source. The presence of COECs in water could be a source of exposure to these species. This measure of effect examines this potential route of exposure.

Approach: This endpoint will be evaluated in multi-pathway exposure models for the mallard and the great blue heron that considers sediment, water, and food. The assessment will compare exposures to these selected representative species within the Dead Creek sectors to:

1) appropriate NOAEL and LOAEL values, and 2) exposures that occur in reference areas.

### Measure of effect 2d: Concentration of COECs in fish.

Purpose and Rationale: Some wildlife species such as the bald eagle, the great blue heron eat primarily fish. This measure of effect evaluates this potential route of exposure.

Approach. Fish will be collected and analyzed for COECs. The COEC levels measured in fish will be used in the multi-pathway exposure model for the bald eagle and the great blue heron that considers sediment, water, and food. Exposures to the bald eagle and the great blue heron within the Dead Creek Sectors will be compared to: 1) appropriate NOAEL and LOAEL values, and 2) exposures that occur in reference areas.

### Measure of effect 2e: Concentration of metals and PAHs in benthic macroinvertebrates (including crayfish).

Purpose and Rationale. Waterfowl (such as the mallard) and mammals (such as the muskrat) eat benthic macroinvertebrates as a portion of their diet. This measure of effect evaluates this potential route of exposure.

Approach: Benthic macroinvertebrates and crayfish will be collected and analyzed for COECs. The COEC levels measured in benthic macroinvertebrates will be used in a multipathway exposure model for the mallard and for the muskrat that considers sediment, water, and food. Exposures to water-fowl and mammals within the Dead Creek Sectors will be compared to: 1) appropriate NOAEL and LOAEL values, and 2) exposures that occur in reference areas.

### 4.3.3 Measures of effects Associated with Assessment Endpoint 3

Assessment Endpoint 3 is survival, growth, and reproduction of individuals within the local bald eagle population in Creek Sectors B through F, and M.

Measure of effect 3a: Concentration of COECs in forage fish for use in evaluating exposure via the food chain.

Purpose and Rationale. Bald eagle may use fish in Dead Creek and associated wetlands as food. The presence of COECs in fish could be a source of exposure to this species. This measure of effect examines this potential route of exposure.

Approach: This endpoint will be evaluated in a an exposure model for the bald eagle. The assessment will compare exposures to: 1) appropriate NOAEL and LOAEL values, and 2) exposures that occur in reference areas.

### 4.3.4 Measures of Effect Associated with Assessment Endpoint 4

Measure of effect 4a: COEC concentrations in soil samples from Creek bank and floodplain as compared to applicable soil screening levels for protection of wildlife, plants, and soil dwelling invertebrates.

Purpose and Rationale. Soil concentrations provide a measure of exposure, and screening level criteria indicate levels above which effects may occur. This measure of effect will evaluate the potential for soil concentrations of COECs in Dead Creek banks and floodplains to cause adverse effects.

Approach: The assessment will compare measured concentrations of total contaminant concentrations in soils to existing (e.g. Oak Ridge National Laboratory Toxicological Benchmarks for Wildlife; Oak Ridge National Laboratory Toxicological Benchmarks for Screening Potential Effects on Terrestrial Plants; Oak Ridge National Laboratory Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes).

We will also use any terrestrial soil screening concentrations or benchmarks developed by the time the proposed work occurs.

### 4.4 Structure of Wildlife Exposure Models

The general form of the wildlife exposure model is:

Exposure Dose (oral) = [Conc<sub>food</sub> \* Ingest<sub>food</sub>] + [RAF \* Conc<sub>soil</sub> \* Sediment<sub>diet</sub> \* Ingest<sub>food</sub>]

Where:

Exposure Dose (oral) = dose of a COEC in ug/g-day

Conc<sub>food</sub> = concentration of the COEC (ug/g) in the food (measured or estimated); this is the average and the 95 % CL concentration in the relevant exposure zone – an area determined by the size and locations of foraging areas. The average is the appropriate statistic because ecological receptors integrate exposure over their foraging areas. We will also use the 95% CL and calculate risk from this exposure separately.

Ingest<sub>food</sub> = amount of food ingested per day normalized to body weight (g/g-day) and usually expressed in terms of wet weight/wet weight

RAF - relative availability factor for COECs in sediment via incidental ingestion of sediment

Conc<sub>sediment</sub> = concentration ug/g in the relevant exposure zone; this is estimated as an average concentration in the exposure zone for chronic exposure and effects, and as upper bound (e.g., maximum or hot spot concentrations) for evaluation of short-term or acute exposures. The average is the appropriate statistic because ecological receptors integrate exposure over their foraging areas.

Sediment<sub>dect</sub> = fraction of sediment in the diet; the product of this number and Ingest<sub>food</sub> yields an estimate of the amount of sediment that is incidentally ingested

Sediments that are collected within shallow water (< 3 feet deep) in open water areas of Dead Creek, sediments along the bank, and soils adjacent to the creek (where available) will be used to assess incidental sediment ingestion. Sediments collected from the top 5 cm will be considered accessible to aquatic wildlife.

Because exposures to COECs associated with diet and sediment will be higher than surface water ingestion, this exposure pathway will not be estimated within the model. However, we will compare National Recommenced Water Quality Criteria for the protection of wildlife to surface water concentrations where such data and corresponding criteria are available.

### **Model Application**

The model will be applied in several ways:

- Acute exposure: The potential for acute exposure is considered without incorporating
  information on foraging area. The rationale for this is that an acute exposure involves a
  short-term feeding or exposure event that does not have to be averaged over the foraging
  area. When calculating the potential for acute exposure, maximum concentrations are used
  within the geographically defined local population or Threatened and Endangered species.
  Locations that exceed exposure concentrations that could result in acute toxic effects are
  identified.
- 2. Chronic exposure to individuals: The potential for chronic exposure to individuals is considered by determining both the maximum concentration and calculating an average concentration of food and sediments at spatial scales defined by the foraging areas of the species. For example, exposure concentrations for a species with a foraging area of 10 ha would be determined by averaging the food and sediments concentrations within this spatial scale. A species with a foraging area of 0.1 ha would have an averaging area that is 100 times less.
- 3. Chronic exposure to the population. The local population as defined above is made up of a number of individuals. Because the success of the local population is not dependent on the risk to any particular individual, a wildlife exposure model will also be used to estimate chronic exposures to individuals throughout the local population. These estimates take into account the spatial distribution of COECs, the foraging areas of the individuals within the species, and possible spatial distributions of these individuals within the area that defines the local population. Results are used to estimate risks as a percentage of the local population. The local population is confined to individual animals that use Dead Creek and its associated wetlands and small ponds.
- 4. Acute and chronic exposures to the Bald Eagle. Because the Bald eagle is rare and the risk to the individual is considered, the wildlife exposure model will also be used to estimate exposures to the individual.

The Waterways Experimental Station on-line database;

The Society of Environmental Toxicology and Chemistry's recently published database of residual effect levels (Jarvinen and Ankley, 1999);

Computer on-line data bases, such as Toxline, Biosis, Wildlife Fisheries Review, Pollution Abstracts, and Environmental Abstracts.

When reviewing the toxicological literature and selecting the most appropriate TRV, several factors will be considered including:

- Taxonomic relationship between the test animal and the indicator species;
- Use of laboratory or domesticated animals;
- Ecological relevance of the study endpoints—Studies with chronic toxicity endpoints, such as reproductive, growth, behavior and developmental endpoints, are targeted. Sensitive endpoints, such as reproductive or developmental toxicity, are preferentially selected because they are closely related to the selected assessment endpoints (e.g., population declines);
- Toxicological studies in which the chemical was administered through the diet of the test species are preferred over studies using other oral dosing methods, such as gavage;
   and
- Long-term studies representing chronic exposure are preferentially selected.

Dietary concentrations (mg/kg diet) cited in the reference study will be converted to mg/kg BW/day. If the daily dose reported in the selected study is a Lowest Adverse Effect Level (LOAEL), then the LOAEL will be converted to a NOAEL using a factor of 10. Interspecies correlations will be considered.

If toxicological animal studies are not available for a particular COEC, then QSAR will be considered and a surrogate chemical will be selected when possible. If the COEC can not be assessed quantitatively, then the risk to the COEC will be qualitatively discussed.

Species specific toxicity factors may not be available for all COEC. In such cases, the assessment will apply the following sequential steps to develop a toxicity factor.

- Use a toxicity value or criterion for the protection of exposed organisms, if an appropriate state or federal agency has proposed it.
- If criteria are unavailable, but appropriate data are available on NOAELs for the receptor species, use the lowest NOAEL for the receptor species.
- If an appropriate NOAEL is unavailable for the receptor species, use a NOAEL for a

species which is phylogenetically similar (within the same genera or family) and ecologically similar to the selected receptor species (e.g. from the same family of birds or mammals).

- If an appropriate NOAEL is unavailable for a phylogenetically similar species, extrapolate from an appropriate NOAEL value for other species (as closely related as possible) by dividing by 5 to account for extrapolations between families and by 10 to account for extrapolations between orders. Use the lowest appropriate NOAEL whenever several studies are available.
- In the absence of an appropriate NOAEL, if a LOAEL is available for a
  phylogenetically similar species, divide it by 10 to account for a LOAEL to NOAEL
  conversion. The LOAEL to NOAEL conversion is similar to EPA's derivation of
  human health RfD values, where LOAEL studies are adjusted by a factor of 10 to
  estimate NOAEL values.
- For calculating chronic toxicity values from data for sub-chronic tests, divide the resultant LOAEL or NOAEL by an additional factor of 10. This is consistent with the methodology used to derive human RfD values. EPA has no clear guidance on the dividing line between subchronic and chronic exposures. The present risk assessment follows recently developed guidance (Sample et al., 1996) which considers 10 weeks to be the minimum time for chronic exposure of birds and 1 year for chronic exposure of mammals. In addition to duration of exposure, the time when exposure to contaminant occurs is critical.
- In cases where NOAELs are available as a dietary concentration (e.g., mg contaminant per kg food), calculate a daily dose for birds or mammals based on standard estimates of food intake rates and body weights (USEPA, 1993c).

### **6.0** DISCUSSION OF UNCERTAINTIES AND EXPOSURE ASSUMPTIONS

Sources of uncertainty and variability within the ERA will be identified. The impact associated with these uncertainties will be qualitatively addressed. Sensitivity analyses will be conducted for the important exposure parameters that are used in the wildlife exposure models and for the TRVs that are used to determine risk to the representative wildlife species.

### 7.0 REFERENCES

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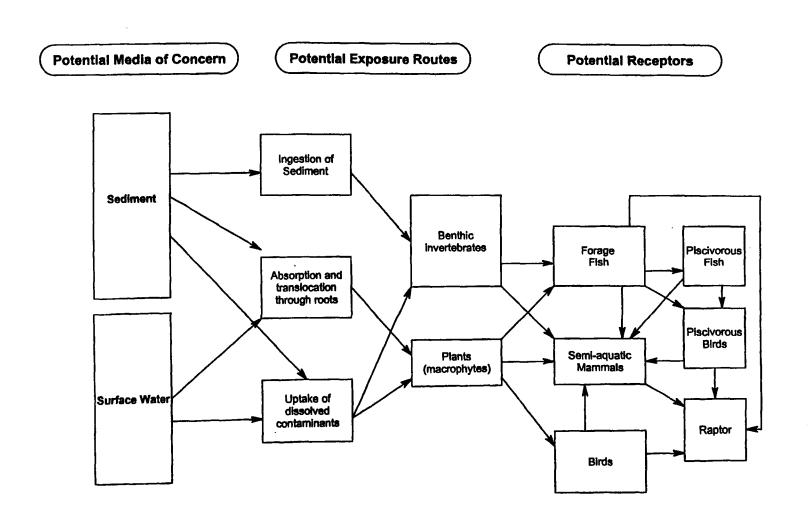
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Jarvinen, A.W. and G.T. Ankley, 1999. Linkage Effects to Tissue Residues: Development of a Comprehensive Database for Aquatic Organisms Exposed to Inorganic and Organic Chemicals. Pensacola FL, Society of Environmental Toxicology and Chemistry Press, 364pp.

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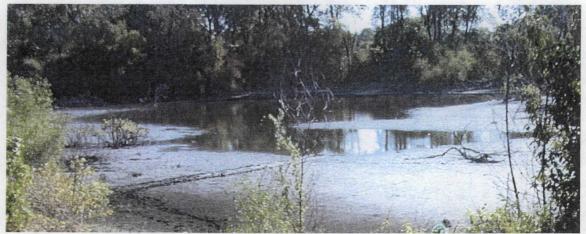
Figure 1-C-1: Preliminary Ecological Conceptual Model



# APPENDIX B PHOTOGRAPHS



Photograph B-1 Dead Creek Section F, October 1999.



Photograph B-2 Low water level in Borrow Pit Lake, October, 1999.



Photograph B-3 Station 2 in Borrow Pit Lake, October, 1999.



Photograph B-4 Station 3 in Borrow Pit Lake, October, 1999.



Photograph B-5 Beach seining in reference location PDC-1 (Prairie DuPont Creek), October, 1999.



Photograph B-6 Reference location PDC-1 (Prairie DuPont Creek), October, 1999.



Photograph B-7 Reference location Ref2-1 (Creek Portion), October, 1999.



Photograph B-8 Reference location Ref2-2 (Lake Portion), October, 1999.



Photograph B-9 Vegetation, Ranunculus reptans, sample, covered with Duckweed, being washed, October, 1999.



Photograph B-10 Shrimp, Palaemonetes kadiakensis, (diameter of sieve is 8 inches), October 1999.



Photograph B-11 Clam, Pyganodon grandis, samples. Specimen in hand is about 5 inches across, October 1999.





# Site Surface Water Summary Statistics Dead Creek Sector F and Borrow Pit Lake Sauget Area I

		<u> </u>	<del></del>			Γ
Compounds	Number	Number Detected	Frequency of Detection	Minimum Detected		Average Concentration
Herbicides, ug/l	Mialyzeu	Detected	Detection	Datactag	Detacted	Concentration
2,4,5-T	1 6		0%			0.25
2,4,5-TP (Silvex)	] 6	ļ	0%			0.25
2,4-D	6		0%			0.25
2,4-DB	6		0% 0%			0.25
Dicamba	6		0%			60/ 0.60
Dichloroprop	6		0%			3.0
Dinoseb	6		0%			3.0
MCPA	6		0%			60
MCPP	6		0%			60
Pentachlorophenol Metals, mg/l	6		0%			0.50
Aluminum	6	6	100%	0.039	3.4	0.92
Antimony	6		0%	0.005	0.4	0.010
Arsenic	6	5	83%	0.0032	0.015	0.0080
Barium	6	6	100%	0.045	0.32	0.14
Beryllium	6		0%			0.0020
Cadmium Calcium	6	اے	100%	,_[	89	0.0025
Chromium	6	6 1	100% 17%	47 0.0041	0.0041	0.0049
Cobalt	6	1	17%	0.0041	0.0041	0.0044
Copper	6	6	100%	0.0016	0.012	0.0052
Cyanide, Total	6	1	0%	Ì		0.0050
Iron	6	6	100%	0.5	8.7	2.3
Lead	6	5	83%	0.002	0.02	0.0056
Magnesium Manganese	6	6 6	100% 100%	26 0.082	33 1.7	31 0.39
Mercury	6	١	0%	0.002	1.7	0.00010
Molybdenum	6	3 (	50%	0.0028	0.004	0.0042
Nickel	6	6	100%	0.0069	0.021	0.013
Potassium	6	6	100%	5.1	7.6	6.6
Selenium	6		0%			0.0050
Silver Sodium	6	6	0% 100%	21	24	0.0050
Thallium	6	J i	0%	~ '	2-7	0.0050
Vanadium	6	4	67%	0.003	0.014	0.0072
Zinc	6	6	100%	0.0073	0.075	0.035
Fluoride (mg/l)	6	6	100%	0.24	0.29	0.26
Hardness as CaCO3 (mg/l)	6	6	100%	220	350	272
Ortho-Phosphate-P (mg/l) pH	6	6	100% 100%	0.063 7.4	0.83 9.7	0.25 8.5
Suspended Solids (mg/l)	6	5	83%	7.7	160	46
Total Dissolved Solids	ě l	6	100%	280	480	358
Total Phosphorus (mg/l)	6	6 [	100%	0.13	1.2	0.37
PCB, ug/l	اء	ľ	ا رو		1	0.05
Decachlorobiphenyl Dichlorobiphenyl	6 6	ŀ	0%  0%	ļ		0.25 0.050
Heptachlorobiphenyl	6	ł	0%	}		0.030
Hexachlorobiphenyl	6	ŀ	0%			0.10
Monochlorobiphenyl	6	ļ	0%	Į		0.050
Nonachlorobiphenyl	6	Ì	0%	1		0.25
Octachiorobiphenyl	6	ļ	0%			0.15
Pentachlorobiphenyl Tetrachlorobiphenyl	6 i		0%  0%			0.10 0.10
Trichlorobiphenyl	6	1	0%			0.050
- Triorio cosprioriti	1	ľ	0,0	ĺ		0.000
Total PCBs	6	i	0%			0.050
Pesticides, ug/i						
4,4'-DDD	6		0%			0.050
4,4'-DDE 4.4'-DDT	6 6	l	0%) 0%	}		0.050
Total DDT	6		0%			0.050 0.050
Aldrin	6	ł	0%	}		0.025
Alpha Chlordane	6		0%			0.025
alpha-BHC	6	2	33%	0.00047	0.001	0.013
beta-BHC	6	3	50%	0.0096	0.02	0.010
delta-BHC	6_	2	33%	0.00013	0.0022	0.0044

## Site Surface Water Summary Statistics Dead Creek Sector F and Borrow Prt Lake Sauget Area I

	T	<u> </u>				
	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected		Concentration
Dieldrin	6	1	17%	0.001	0.001	0.042
Endosulfan I	6	2	33%	0.0015	0.0024	0.017
Endosulfan II	6		0%			0.050
Endosulfan sulfate	6	1	17%	0.0032	0.0032	0.042
Endnn Endnn aldehyde	6	1 2	17% 33%	0.00095 0.0016	0.00095 0.0032	0.042 0.034
Endon ketone	6	1	17%	0.0077	0.0032	0.042
Gamma Chlordane	6	' '	0%	0.0027	0.0027	0.025
gamma-BHC (Lindane)	6	2	33%	0.0024	0.0038	0.007
Heptachior	6	3	50%	0.0022	0.0029	0.014
Heptachior eposode	6	2	33%	0.0009	0.00096	0.017
Methoxychlor	6		0%			0.25
Toxaphene	6		0%			2.5
SVOCs, ug/l						
1,2,4-Trichlorobenzene	6		0%		}	5.0
1.2-Dichlorobenzene	6		0%			5.0
1.3-Dichlorobenzene	6		0%			5.0
1,4-Dichlorobenzene	6	1	0%		1	5.0
2,2'-Oxybis(1- 2,4,5-Trichlarophenol	6		0% 0%		ļ	5.0 5.0
2,4,6-Trichlorophenol	6		0%			1.1
2,4-Dichlorophenoi	6		0%		į	5.0
2,4-Dintrophenoi	6		0%			7.0
2,4-Dinitrotoluene	6		0%	1		5.0
2,6-Dinitrololuene	6		0%			5.0
2-Chloronaphthalene	6		0%			5.0
2-Chiarophenol	6		0%		1	5.0
2-Methytnaphthalene	6		0%			5.0
2-Methylphenal (o-cresal)	6		0%			5.0
2-Nitroeniine	6	ŀ	0%	1	ľ	25
2-Nitrophenol	6		0%			5.0
3,3'-Dichlorobenzidine	6		0%			10
3-MethytphenoV4-	6	Į.	0% 0%i			5.0
3-Nitroeniine	6		0%		İ	25 6.5
i_6-Dinitro-2-methylphenol i-Bromophenylphenyl ether	6	J	0%	}	j	0.50
-Chloro-3-methylphenol	6		0%		ŀ	5.0
I-Chlorogniline	6		0%		ŀ	10
-Chlorophenylphenyl ether	6		0%		ŀ	5.0
l-Naroaniine	6		0%			25
-Nitrophenol	6		0%		ŀ	25
Voeraphthene	6	1	0%	1	1	5.0
cenaphthylene	6		0%		1	5.0
Vnithracene	6		0%			5.0
enzo(a)enthracene	6		0%			5.0
Senzo(a)pyrene	6		0%			5.0
Benzo(b)fluoranthene	6		0%	į		5.0 5.0
Benzo(g.h.i)perylene	6		0%		Į.	5.0 5.0
Benzo(k)fluoranthene us(2-	6		0%	1	!	5.0
is(2-Chloroethyl)ether	6		0%			5.0 <sub>1</sub>
s(2-Ethylhexyl)phthalate	6		0%			0.90
utylbenzylphthalate	6		0%			5.0
arbezole	6	- 1	0%			5.0
hrysene	6		0%			5.0
h-n-butylphthelete	6		0%			5.0
i-n-octylphthelate	6		0%			5.0
Diberzo(a,h)anthracene	6		0%			5.0
Noenzofuran	6		0%			5.0
hethylphthalate	6	ľ	0%			5.0
imethylphthalate	6	1	0%			5.0
luoranthene	6	1	17%	0.7	0.7	4.3
luorene	6	i	0%			0.50
lexachlorobenzene	6	- 1	0%			5.0
lexachiorobutadiene	6	J	0%			5.0
lexachiorocyclopentadien	6		0%			5.0
exactionethane	6	- 1	0% 0%			0.95
ndeno(1,2,3-cd)pyrene cophorone	6		0%			5.0 5.0
NA CHOICE	0		U76			5.0

# Site Surface Water Summary Statistics Dead Creek Sector F and Borrow Pit Lake Sauget Area I

	·		· · · · · ·			[
	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds		Detected		Detected	Detected	Concentration
N-Nitroso-di-n-propylamine	6		0%			5.0
N-Nitrosodiphenylamine	6		0%			2.5
Naphthalene	6		0%			5.0
Nitrobenzene	6		0%			1.8
Pentachlorophenol	6		0%			2.5
Phenanthrene	6	1	17%	0.7	0.7	4.3
Phenol	6		0%			5.0
Pyrene	6		0%			5.0
Total PAHs	6	1	17%	1.4	1.4	4.4
VOCs, ug/I						
1,1,1-Trichloroethane	6		0%			2.5
1,1,2,2-Tetrachloroethane	6		0%			2.5
1,1,2-Trichloroethane	6		0%			2.5
1,1-Dichloroethane	6		0%			2.5
1,1-Dichloroethene	6		0%			2.5
1.2-Dichloroethane	6		0%			2.5
1,2-Dichloropropane	6		0%			2.5
2-Butanone (MEK)	6		0%			13
2-Hexanone	6	1	0%			13
4-Methyl-2-pentanone	6		0%			13
Acetone	6	3	50%	13	18	20
Benzene	6	1	17%	1.7	1.7	0.78
Bromodichloromethane	6	1	0%	· · · · J		2.5
Bromoform	6		0%			2.5
Bromomethane (Methyl	6	}	0%	l		4.9
Carbon disulfide	6	ĺ	0%	1		2.5
Carbon tetrachloride	6		0%			2.5
Chlorobenzene	6	ł	0%	ì		2.5
Chloroethane	6	ļ	0%	ļ		5.0
Chloroform	6	}	0%	)		2.5
Chloromethane	6		0%			5.0
cis-1,3-Dichloropropene	6		0%	j		0.5
Cis/Trans-1.2-	6	i	0%	[		2.5
Dibromochloromethane	6	ĺ	0%			2.5
Ethylbenzene	6	ľ	0%	l		2.5
Methylene chloride	6		0%			2.4
Styrene	6	ļ	0%	}		2.5
Tetrachloroethene	6	-	0%	}		2.5
Toluene	6		0%	J		2.5
trans-1,3-Dichloropropene	6		0%			2.5
Trichloroethene	6		0%			1.4
Vinyl chloride	6	ĺ	0%	j		5
Xylenes, Total	6		0%	i		2.5

# Site Surface Water Dioxin Data Summary Dead Creek Sector F and Borrow Pit Lake Sauget Area I

		I				
		<b>A</b> 1 <b>-</b>	F	<b></b>	<b>A.</b>	•
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dioxins and Furans, ug/l				_		
1,2,3,4,6,7,8,9-OCDD	6	5	83%	5.73E-04	1.43E-03	7.08E-04
1,2,3,4,6,7,8,9-OCDF	6	5	83%	5.03E-05	2.60E-04	1.21E-04
1,2,3,4,6,7,8-HpCDD	6	4	67%	4.42E-05	6.92E-05	4.41E-05
1,2,3,4,6,7,8-HpCDF	6	6	100%	1.34E-05	5.05E-05	2.72E-05
1,2,3,4,7,8,9-HpCDF	6	1	17%	5.48E-04	5.48E-04	9.45E-05
1,2,3,4,7,8-HxCDD	6		0%			2.73E-06
1,2,3,4,7,8-HxCDF	6	1	17%	2.40E-05	2.40E-05	6.05E-06
1,2,3,6,7,8-HxCDD	6		0%			2.56E-06
1,2,3,6,7,8-HxCDF	6	1	17%	8.90E-06	8.90E-06	3.39E-06
1,2,3,7,8,9-HxCDD	6		0%			2.66E-06
1,2,3,7,8,9-HxCDF	6		0%			2.67E-06
1,2,3,7,8-PeCDD	6		0%			3.19E-06
1,2,3,7,8-PeCDF	6		0%			2.04E-06
2,3,4,6,7,8-HxCDF	6		0%			2.38E-06
2,3,4,7,8-PeCDF	6		0%	ľ		2.15E-06
2,3,7,8-TCDD	6		0%			2.96E-06
2,3,7,8-TCDF	6		0%			2.52E-06
Total HpCDD	6	4	67%	9.35E-05	1.28E-04	9.07E-05
Total HpCDF	6	5	83%	4.16E-05	6.00E-04	1.65E-04
Total HxCDD	6	2	33%	6.20E-06	9.02E-05	1.91E-05
Total HxCDF	6	2	33%	2.49E-05	5.81E-04	1.04E-04
Total PeCDD	6	}	0%	]	ł	3.19E-06
Total PeCDF	6		0%			2.10E-06
Total TCDD	6		0%			2.96E-06
Total TCDF	6		0%			2.52E-06

## Note:

# Dead Creek Sector F Surface Water Data Summary Sauget Area I

Appendix C-1.3

	T	]	T			
1	Number	Number	  Frequency o	  Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/i						
2,4,5-T	3		0%			0.25
2,4,5-TP (Silvex)	] 3		0%			0.25
2,4-D	] 3		0%			0.25
2,4-DB	3		0%			0.25
Dalapon	3		0%			60
Dicamba	3		0%			0.60
Dichloroprop	3		0%			3.0
Dinoseb	3		0%			3.0
MCPA	3		0%			60
MCPP	3		0%			60
Pentachlorophenol	3		0%			0.50
Metals, mg/l						
Aluminum	~ 3 <u> </u>	3	100%	0.039	0.55	0.25
Antimony	3		0%			0.010
Arsenic	ີ <b>່ 3</b>	2	67%	0.0032	0.0049	0.0044
Barium	3	3	100%	0.12	0.13	0.13
Beryllium	ຶ່] 3		0%			0.0020
Cadmium	3		0%			0.0025
Calcium	] 3	3	100%	52	53	53
Chromium	] 3		0%			0.0050
Cobalt	3		0%	' I		0.0050
Copper	] 3 [	3	100%	0.0016	0.012	0.0052
Cyanide, Total	3	-	0%	(		0.0050
Iron	] 3	3	100%	0.5	1.0	0.68
Lead	] 3	2	67%	0.0022	0.0037	0.0028
Magnesium	] 3	3	100%	30	33	32
Manganese	] 3	3	100%	0.082	0.14	0.11
Mercury	] 3 [	{	0%			0.00010
Molybdenum	3	1	33%	0.0028	0.0028	0.0043
Nickel	] 3	3	100%	0.0069	0.021	0.014
Potassium	3	3	100%	6.4	6.9	6.6
Selenium	3	1	0%			0.0050
Silver	] 3 [		0%(	ĺ	í	0.0050
Sodium	] 3	3 ]	100%	21	22	21
Thallium	3		0%			0.0050
Vanadium	3	1 ]	33%	0.003	0.0030	0.0043
Zínc	3	3	100%	0.0073	0.075	0.039
Fluoride (mg/l)	3	3	100%	0.24	0.27	0.25
Hardness as CaCO3 (mg/l)	3	3	100%	260	270	263
Ortho-Phosphate-P (mg/l)	3	3	100%	0.063	0.12	0.092
pH	3	3	100%	7.4	8.6	7.9
Suspended Solids (mg/l)	3	2	67%	8	12	7.5
Total Dissolved Solids	3	3	100%	330	360	347
Total Phosphorus (mg/l)	3	3	100%	0.13	0.18	0.15
PCB, ug/l	<del>  </del>					
Decachlorobiphenyl	3	ļ	0%	j	ļ	0.25
Dichlorobiphenyl	3	J	0%	ļ		0.050
Heptachlorobiphenyl	3	l	0%			0.15
Hexachlorobiphenyl	3	l	0%		Ì	0.10
Monochlorobiphenyl	3 1	Í	0%	ł	ĺ	0.050
Nonachlorobiphenyl	3 3 3	- 1	0%	ŀ		0.25
Octachlorobiphenyl	3	-	0%	1	1	0.15
Pentachlorobiphenyl	3		0%		ļ	0.10
Tetrachlorobiphenyl	3	j	0%	j	j	0.10
Trichlorobiphenyl	3		0%			0.050
Total PCBs	3		0%		ļ	0.050

# Dead Creek Sector F Surface Water Data Summary Sauget Area I

	I		1	<u> </u>	1	_
		<b></b>			<b>36</b>	<b>A.</b>
Compounds	Number Analyzed		Frequency of Detection			Average Concentration
Pesticides, ug/l	Assiyasu	Detected	Detection	Detected	Detected	CONCERN AUG
4,4'-DOO	3		0%			0.050
4.4'-DDE	3		0%			0.050
4.4'-DOT	3		0%			0.050
Total DDT	3		0%			0.050
Aldrin	3		0%			0.025
Alpha Chlordane	3		0%			0.025
alpha-BHC	] 3		0%			0.020
beta-BHC	3		0%	}		0.0070
delta-BHC	3		0%			0.0060
Dieldrin	3		0%			0.050
Endosulfan I Endosulfan II	3		0%			0.025
Endosulfan sulfate	3		0% 0%			0.050 0.050
Endrin	3		0%			0.050
Endrin aldehyde	3		0%			0.050
Endrin ketone	3		0%			0.050
Gamma Chlordane	3		0%			0.025
gamma-BHC (Lindane)	3		0%			0.010
Heptachlor	3		0%			0.025
Heptachlor epoxide	3		0%			0.025
Methoxychlor	3		0%			0.25
Toxaphene	3		0%			2.5
\$VOCs, ug/l						
1,2,4-Trichlorobenzene	3		0%			5.0
1.2-Dichlorobenzene	3		0%			5.0
1,3-Dichlorobenzene	3 3		. 0%			5.0
1,4-Dichlorobenzene 2,2'-Oxybis(1-	3		0% 0%			5.0 5.0
2,4,5-Trichlorophenol	3		0%			5.0 5.0
2,4,6-Trichlorophenol	3		0%			1.1
2,4-Dichlorophenol	3		0%			5.0
2,4-Dinitrophenol	3		0%			7.0
2,4-Dinitrotoluene	3		0%			5.0
2.6-Dinitrotoluene	3		0%			5.0
2-Chloronaphthalene	3		0%			5.0
2-Chlorophenol	3		0%			5.0
2-Methylnaphthalene	3		0%			5.0
2-Methylphenol (o-cresol)	3		0%			5.0
2-Nitroaniline	3		0%			25
-Nitrophenol	3		0%			5.0
3,3'-Dichlorobenzidine 3-Methylphenol/4-	3 3		0% 0%		İ	10 5.0
-Menyprenov-	3		0%			5.0 25
.6-Dinitro-2-methylphenol	3		0%			6.5
-Bromophenylphenyl	3		0%		İ	0.50
-Chloro-3-methylphenol	3		0%		ļ	5.0
-Chloroaniline	3		0%			10
-Chlorophenylphenyl	3		0%			5.0
Nitroaniine	3		0%			25
-Nitrophenol	3		0%			25
cenaphthene	3		0%			5.0
cenaphthylene	3		0%			5.0
nthracene	3		0%			5.0
enzo(a)anthracene	3		0%	' I		5.0
enzo(a)pyrene	3		0%			5.0
enzo(b)fluoranthene	3		0%			5.0
enzo(g,h,i)perylene	3		0%			5.0
enzo(k)fluoranthene	3		0%			5.0
is(2-	3		0%			5.0
is(2-Chloroethyl)ether	3		0%		ļ	5.0
is(2-Ethythexyl)phthalate	3		0%		1	0.90
utybenzylphthalate	3		0%			5.0
arbazole	3		0%			5.0
thrysene	3		0%			5.0

# Dead Creek Sector F Surface Water Data Summary Sauget Area I

<del></del>	1	<del> </del>	<del>,</del>	<del>,                                    </del>		
			L			
Companye	Number	Number Detected	Frequency of Detection			Average Concentration
Compounds Di-n-butylphthalate	Analyzed 3	Detected	O%	Detected	Detected	5.0
Di-n-octylphthalate	3		0%			5.0 5.0
	3			ŀ		5.0 5.0
Dibenzo(a,h)anthracene			0%	1		
Dibenzofuran	3		0%	}		5.0
Diethylphthalate	3		0%			5.0
Dimethylphthalate	3		0%		0.7	5.0
Fluoranthene	3	1	33%	0.7	0.7	3.6
Fluorene	3		0%	<b>i</b> 1		0.50
Hexachlorobenzene	3		0%	ļ	j	5.0
Hexachlorobutadiene	3		0%			5.0
Hexachlorocyclopentadien	3		0%			5.0
Hexachloroethane	3		0%			0.95
Indeno(1,2,3-cd)pyrene	3		0%			5.0
Isophorone	3		0%			5.0
N-Nitroso-di-n-propylamine	3		0%			5.0
N-Nitrosodiphenylamine	3		0%			2.5
Naphthalene	3	İ	0%			5.0
Nitrobenzene	3		0%			1.8
Pentachlorophenol	3	ļ	0%			2.5
Phenanthrene	3	1 ]	33%	0.7	0.7	3.6
Phenol	3	1	0%			5.0
Pyrene	3		0%			5.0
Total PAHs	3	1	33%	1.4	1.4	3.8
VOCs, ug/l				_		
1,1,1-Trichloroethane	3		0%			2.5
1,1,2,2-Tetrachloroethane	3	ľ	0%			2.5
1,1,2-Trichloroethane	3	1	0%			2.5
1,1-Dichloroethane	3 (	ſ	0%(			2.5
1,1-Dichloroethene	3	j	0%			2.5
1,2-Dichloroethane	3		0%	· 1	i	2.5
1,2-Dichloropropane	3	}	0%			2.5
2-Butanone (MEK)	3		0%			13
2-Hexanone	3	}	0%			13)
4-Methyl-2-pentanone	3		0%			13
Acetone	3	Ì	0%	}	ł	25
Benzene	3	1	33%	1.7	1.7	0.97
Bromodichloromethane	3	1	0%	ľ	i	2.5
Bromoform	3		0%	ļ		2.5
Bromomethane (Methyl	3	í	0%	- (	ľ	4.9
Carbon disulfide	3	J	0%	}	- 1	2.5
Carbon tetrachloride	3		0%			2.5
Chlorobenzene	3		0%			2.5
Chloroethane	3		0%			5.0
Chloroform	3	1	0%	1		2.5
Chloromethane	3	(	0%	ſ	į	5.0
cis-1,3-Dichloropropene	3 (	l	0%		ł	0.50
Cis/Trans-1,2-	3	İ	0%	ļ		2.5
Dibromochloromethane	3	1	0%	ľ		2.5
Ethylbenzene	3	Į	0%	Ì		2.5
Methylene chloride	3	l	0%	}		2.4
	3		0%			2.5
Styrene	3	[		ĺ		
Tetrachloroethene	3	1	0%	j		2.5
Toluene	ချ		0%			2.5
trans-1,3-Dichloropropene	3	Į	0%	,		2.5
Trichloroethene	3	1	0%	ł		1.4
Vinyl chloride	3	1	0%	}		5.0
Xylenes, Total	3		0%			2.5

### Note:

Appendix C-1.4

Dioxin Surface Water Data Summary for Dead Creek Sector F
Sauget Area I

			<u> </u>	·		
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dioxins and Furans, ug/l						
1,2,3,4,6,7,8,9-OCDD	3	2	67%	5.73E-04	6.17E-04	4.24E-04
1,2,3,4,6,7,8,9-OCDF	3	3	100%	8.17E-05	2.60E-04	1.91E-04
1,2,3,4,6,7,8-HpCDD	3	2	67%	6.29E-05	6.92E-05	4.71E-05
1,2,3,4,6,7,8-HpCDF	3	3	100%	1.34E-05	5.05E-05	3.63E-05
1,2,3,4,7,8,9-HpCDF	3	1	33%	5.48E-04	5.48E-04	1.84E-04
1,2,3,4,7,8-HxCDD	3		0%			2.12E-06
1,2,3,4,7,8-HxCDF	3	1	33%	2.40E-05	2.40E-05	8.98E-06
1,2,3,6,7,8-HxCDD	3		0%			1.98E-06
1,2,3,6,7,8-HxCDF	3	1	33%	8.90E-06	8.90E-06	3.88E-06
1,2,3,7,8,9-HxCDD	3		0%			2.07E-06
1,2,3,7,8,9-HxCDF	3		0%			1.88E-06
1,2,3,7,8-PeCDD	3		0%			3.13E-06
1,2,3,7,8-PeCDF	3		0%			1.80E-06
2,3,4,6,7,8-HxCDF	3		0%			1.68E-06
2,3,4,7,8-PeCDF	3		0%			1.90E-06
2,3,7,8-TCDD	3		0%			2.60E-06
2,3,7,8-TCDF	3		0%			1.97E-06
Total HpCDD	3	2	67%	1.27E-04	1.28E-04	9.13E-05
Total HpCDF	3	2	67%	1.82E-04	6.00E-04	2.83E-04
Total HxCDD	3	1	33%	9.02E-05	9.02E-05	3.37E-05
Total HxCDF	3	2	67%	2.49E-05	5.81E-04	2.04E-04
Total PeCDD	3		0%	1		3.13E-06
Total PeCDF	3		0%	ľ		1.85E-06
Total TCDD	3		0%	1		2.60E-06
Total TCDF	3		0%			1.97E-06

# Note:

# Borrow Pit Lake Surface Water Data Summary Sauget Area I

	Γ	l		Γ	[	
			L			•
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum	Detected	Average Concentration
Herbicides, ug/l	Allalyzed	Detected	Detection	Detected	Detected	Concentration
2,4,5-T	3		0%	[	ĺ	0.25
2,4,5-TP (Silvex)	3		0%			0.25
2,4-D	3		0%		) }	0.25
2,4-DB	1 3		0%			0.25
Dalapon	3		0%		l l	60
Dicamba	3		0%		ĺ	0.60
Dichloroprop	3		0%			3.0
Dinoseb	3		0%	l		3.0
MCPA	3		0%			60
MCPP	3		0%			60
Pentachlorophenol	Í š l		0%		1	0.50
Metals, mg/l						
Aluminum	3	3	100%	0.65	3.4	1.6
Antimony	3	_	0%		iI	0.010
Arsenic	3	3	100%	0.0079	0.015	0.012
Barium	3	3	100%	0.045	0.32	0.16
Beryllium	3		0%		1	0.0020
Cadmium	3		0%			0.0025
Calcium	3	3	100%	47	89	64
Chromium	3	1	33%	0.0041	0.0041	0.0047
Cobalt	3 (	1 (	33%	0.0015	0.0015	0.0038
Copper	3	3	100%	0.0036	0.0074	0.0053
Cyanide, Total	3	- 1	0%		1	0.0050
Iron	3	3	100%	1.3	8.7	3.9
Lead	3	3	100%	0.002	0.02	0.0083
Magnesium	3	3 (	100%	26	31	29
Manganese	3	3	100%	0.13	1.7	0.67
Mercury	3	1	0%		}	0.00010
Molybdenum	3	2	67%	0.0035	0.004	0.0042
Nickel	3	3	100%	0.0077	0.015	0.012
Potassium	3	3 (	100%	5.1	7.6	6.6
Selenium	3		0%		ł	0.0050
Silver	3	}	0%		,	0.0050
Sodium	3	3 ]	100%	21	24	22
Thallium	3	1	0%		ŀ	0.0050
Vanadium	3	3	100%	0.0051	0.014	0.010
Zinc	3	3	100%	0.017	0.048	0.031
Fluoride (mg/l)	3	3	100%	0.25	0.29	0.26
Hardness as CaCO3 (mg/l)	3	3	100%)	220	350	280
Ortho-Phosphate-P (mg/l)	3	3	100%	0.2	0.83	0.42
PH	3	3	100%	8.5	9.7	9.1
Suspended Solids (mg/l)	3	3	100%	37	160	84
Total Dissolved Solids (mg/l)	3	3	100%	280	480	370
Total Phosphorus (mg/l)	3	3	100%	0.26	1.2	0.59
PCBs, ug/l	_ [	1		ł	ł	
Decachlorobiphenyl	3		0%		-	0.25
Dichlorobiphenyl	3	}	0%			0.050
Heptachlorobiphenyl	3		0%	l l	1	0.15
Hexachlorobiphenyl	3 3 3 3 3 3 3	-	0%	ĺ	1	0.10
Monochlorobiphenyl	3	1	0%	ł	ì	0.050
Nonachlorobiphenyl	3		0%		1	0.25
Octachlorobiphenyl	3		0%			0.15
Pentachlorobiphenyl	3		0%			0.10
Tetrachlorobiphenyl	3	ľ	0%	ľ	İ	0.10
Trichlorobiphenyl		-	0%	1	- 1	0.050
Total PCBs	3		0%		Ì	0.050
Postleides ug/					<del></del>	
Pesticides, ug/i	اء		0%			ا محماً
4,4'-DDD 4,4'-DDE	3 3	}	0%) 0%	l	1	0.050 0.050
4,4'-DDT	3	ł	0%) 0%	}	- 1	
Total DDT	3		0% 0%			0.050
ו טעו טט ו	3		0%			0.050

### Borrow Pit Lake Surface Water Data Summary Sauget Area I

	T	Γ				1
	Number	Number	Frequency o	Minimum	Maximum	Average
Compounds	Analyzed	Detected			Detected	Concentration
Aldrin	3		0%			0.025
Alpha Chlordane	1 3		0%	ĺ		0.025
alpha-BHC	3	2	67%	0.00047	0.001	0.0070
beta-BHC	3	3	100%	0.0096	0.02	0.014
delta-BHC	3	2	67%	0.00013	0.0022	0.0028
Dieldrin	3	1	33%	0.001	0.001	0.034
Endosulfan I	3	2	67%	0.0015	0.0024	0.0096
Endosulfan II	3	_	0%	3.00		0.050
Endoculian sulfate	3	1	33%	0.0032	0.0032	0.034
Endrin	3	1	33%	0.00095	0.00095	0.034
Endrin aldehyde	3	2	67%	0.0016	0.0032	0.018
Endrin ketone	3	1	33%	0.0027	0.0027	0.034
Gamma Chlordane	3	•	0%	0.0027	0.0021	0.025
gamma-BHC (Lindane)	3	2	67%	0.0024	0.0038	0.0052
Heptachlor	3	3	100%	0.0022	0.0029	0.0026
	3	2	67%	0.0022		0.0020
Heptachlor epoxide	3	2	0%	U.UUUS	0.00096	
Methoxychior	3		0%			0.25
Toxaphene	3		076			2.5
\$340Ca 454		_				
SVOCs, ug/l 1,2,4-Trichlorobenzene	3		0%			5.0
	- 1					
1,2-Dichlorobenzene	3		0%			5.0
1,3-Dichlorobenzene			0%			5.0
1,4-Dichloroberzene	3		0%			5.0
2.2'-Oxybis(1-	3		0%			5.0
2.4.5-Trichlorophenol	3		0%			5.0
2.4.6-Trichlorophenol	3		0%			1.1
2.4-Dichlorophenol	3		0%			5.0
2,4-Dinitrophenol	3		0%			7.0
2.4-Dinitrotoluene	3		0%			5.0
2.6-Dinitrotoluene	3		0%			5.0
2-Chloronaphthalene	3	- 1	0%			5.0
2-Chilorophenol	3		0%			5.0
2-Methylnaphthalene	3		0%			5.0
2-Methylphenol (o-cresol)	3		0%			5.0
2-Nitroaniline	3		0%			25
2-Nitrophenol	3	1	0%	- 1		5.0
3,3'-Dichlorobenzidine	3		0%			10
3-Methytphenol/4-	3		0%			5.0
3-Nitroaniline	3		0%		1	25
4,6-Dinitro-2-methylphenol	3		0%		-	6.5
4-Bromophenylphenyl ether	3	}	0%		ł	0.50
4-Chloro-3-methytphenol	3		0%			5.0
4-Chloroaniline	3	ļ	0%	]		10
4-Chlorophenylphenyl ether	3		0%			5.0
1-Nitroaniline	3	1	0%			25
l-Nitrophenol	3	!	0%	ļ		25
Acensphilhene	3	!	0%			5.0
Acenaphthylene	3	į	0%		1	5.0
Anthracene	3	ļ	0%			5.0
Benzo(a)anthracene	3	i	0%			5.0
Benzo(a)pyrene	3	-	0%			5.0
Benzo(b) fluoranthene	3	-	0%			5.0
Benzo(g.hu)perytene	3		0%	ļ		5.0
Benzo(k)fluoranthene	3		0%	1		5.0
ois(2-Chioroethoxy)methane	3		0%			5.0
ois(2-Chloroethyl)ether	3		0%	!		5.0 5.0
pis(2-Ethylhexyl)phthalate	3		0%	ı	-	0.90
Sutybenzylphthalate	3		0%	I	1	0.90 5.0
Carbazole	3		0%	ŀ		
	<u> </u>					5.0

# Borrow Pit Lake Surface Water Data Summary Sauget Area I

	7	1				
	Number	Number		RAIS ISSUE	Marian	Average
Compounds	Number Analyzed	Detected	Frequency of Detection	Detected	Detected	Average Concentration
Chrysene	3	Detected	0%	Dotected	Detacted	5.0
Di-n-butylphthalate	1 3		0%		1 1	5.0
Di-n-octylphthalate	3		0%		J	5.0
Dibenzo(a,h)anthracene	1 3		0%		1 1	5.0
Dibenzofuran	1 3		0%			5.0
Diethylphthalate	1 3		0%		1 1	5.0
Dimethylphthalate	3		0%			5.0
Fluoranthene	3		0%		<b>!</b>	5.0
Fluorene	î 3 l		0%		1	0.50
Hexachlorobenzene	3		0%		}	5.0
Hexachlorobutadiene	3		0%		1	5.0
Hexachlorocyclopentadiene	3		0%			5.0
Hexachloroethane	] 3		0%			0.95
Indeno(1,2,3-cd)pyrene	] 3		0%		l l	5.0
Isophorone	] 3		0%			5.0
N-Nitroso-di-n-propylamine	] 3		0%			5.0
N-Nitrosodiphenylamine	3		0%			2.5
Naphthalene	] 3		0%			5.0
Nitrobenzene	] 3 [	ĺ	0%		1	1.8
Pentachlorophenol	] 3	ļ	0%			2.5
Phenanthrene	] 3	ľ	0%			5.0
Phenol	3	}	0%		l ,	5.0
Pyrene	3	1	0%			5.0
Total PAHs	3		0%			5.0
VOCs, ug/l		}			1	}
1,1,1-Trichloroethane	3	1	0%		}	2.5
1,1,2,2-Tetrachloroethane	3	- 1	0%	-		2.5
1,1,2-Trichloroethane	3		0%			2.5
1,1-Dichloroethane	3		0%			2.5
1,1-Dichloroethene 1,2-Dichloroethane	3 3	i	0%}		İ	2.5
1,2-Dichloropropane	3	ļ	0%  0%	ļ	·	2.5
2-Butanone (MEK)	3	ļ	0%		1	2.5
2-Hexanone	3	j	0%	j	}	13) 13
4-Methyl-2-pentanone	3		0%			13
Acetone	3	3	100%	13	18	15
Benzene	3	<b>"</b>	0%	ا"	[	0.6
Bromodichloromethane	3	}	0%	1	i	2.5
Bromoform	3		0%	ĺ	1	2.5
Bromomethane (Methyl	3		0%	1	1	4.9
Carbon disulfide	3	1	0%		i	2.5
Carbon tetrachloride	3		0%			2.5
Chlorobenzene	3	ľ	0%	1	ì	2.5
Chloroethane	3		0%		l	5.0
Chloroform	3	1	0%	- }	Į.	2.5
Chloromethane	3		0%	1	1	5.0
cis-1,3-Dichloropropene	3	-	0%	1	}	0.50
Cis/Trans-1,2-	3		0%		Ļ	2.5
Dibromochloromethane	3		0%		ļ	2.5
Ethylbenzene	3	ĺ	0%∫	[	ĺ	2.5
Methylene chloride	3	]	0%	J	J	2.4
Styrene	3		0%	1	[	2.5
Tetrachloroethene	3	j	0%	j		2.5
Toluene	3	1	0%[	ĺ	(	2.5
trans-1,3-Dichloropropene	3		0%		<b> </b>	2.5
Trichloroethene	3	į	0%		l	1.4
Vinyl chloride	3	1	0%	}	}	5.0
Xylenes, Total	3		0%]	1		2.5

Appendix C-1.6

# Dioxin Surface Water Summary Statistics Borrow Pit Lake Sauget Area I

	Number	Marinhan		88::		•
 	1	Number Detected	Frequency of Detection	Minimum  Detected	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Dioxins and Furans, ug/l						
1,2,3,4,6,7,8,9-OCDD	3	3	100%	7.51E-04	1.43E-03	9.91E-04
1,2,3,4,6,7,8,9-OCDF	3	2	67%	5.03E-05	7.10E-05	5.05E-05
1,2,3,4,6,7,8-HpCDD	3	2	67%	4.42E-05	5.69E-05	4.12E-05
1,2,3,4,6,7,8-HpCDF	3	3	100%	1.44E-05	2.17E-05	1.80E-05
1,2,3,4,7,8,9-HpCDF	3		0%			4.83E-06
1,2,3,4,7,8-HxCDD	3		0%			3.35E-06
1,2,3,4,7,8-HxCDF	3		0%			3.12E-06
1,2,3,6,7,8-HxCDD	3		0%			3.13E-06
1,2,3,6,7,8-HxCDF	3		0%			2.90E-06
1,2,3,7,8,9-HxCDD	3		0%			3.25E-06
1,2,3,7,8,9-HxCDF	3		0%			3.45E-06
1,2,3,7,8-PeCDD	3		0%			3.25E-06
1,2,3,7,8-PeCDF	3		0%			2.28E-06
2,3,4,6,7,8-HxCDF	3		0%	ſ		3.07E-06
2.3,4,7,8-PeCDF	3		0%			2.40E-06
2,3,7,8-TCDD	3		0%			3.32E-06
2,3,7,8-TCDF	3		0%			3.07E-06
Total HpCDD	3	2	67%	9.35E-05	1.22E-04	9.02E-05
Total HpCDF	3	3	100%	4.16E-05	5.51E-05	4.76E-05
Total HxCDD	3	1	33%	6.20E-06	6.20E-06	4.43E-06
Total HxCDF	3		0%			3.12E-06
Total PeCDD	3		0%			3.25E-06
Total PeCDF	3 .		0%			2.35E-06
Total TCDD	3		0%	ſ	[	3.32E-06
Total TCDF	3		0%			3.07E-06

### Note:

# Reference Area Surface Water Data Summary Sauget Area I

	<del></del>	г	<del></del>	Γ		
	Number	Number	Frequency o	Minimum	Maximum	Averene
Compounds	Analyzed	Detected				Average Concentration
Herbicides, ug/l	Allalyzed	Detected	Detection	Detected	Detected	DOILCEILLI ACIOI
2,4,5-T	1 4		0%			0.25
2,4,5-TP (Silvex)	4		0%			0.25
2,4-D	4		0%			0.25
2,4-DB	4		0%			0.25
Dalapon	1 4		0%		'	60
Dicamba	4		0%			0.60
Dichloroprop	4		0%			3.00
Dinoseb	4		0%			3.00
MCPA	4		0%			60
MCPP	4		0%			60
Pentachlorophenol	4		0%			0.50
Metals, mg/i	<del></del>		0.70			0.50
Aluminum	4	4	100%	9.4	19.5	13
Antimony	4	4	0%	9.4	19.5	0.01
Arsenic	4	4	100%	0.0093	0.017	
Barium		4	100%			0.01
	4	4		0.32	0.41	0.36
Beryllium	4	2	50%	0.00067	0.00083	0.001
Cadmium	4		0%	~~		0.003
Calcium	4	4	100%	50	72	59
Chromium	4	4	100%	0.011	0.0225	0.02
Cobalt	4	4	100%	0.0047	0.0076	0.01
Copper	4	4	100%	0.0097	0.0185	0.01
Cyanide, Total	4	. !	0%			0.01
Iron	4	4	100%	11	25.5	16
Lead	4	4	100%	0.02	0.032	0.03
Magnesium	4	4	100%	23	35	27
Manganese	4	4	100%	1.5	2.9	1.98
Mercury	4		0%			0.0001
Molybdenum	4	4	100%	0.0032	0.00655	0.01
Nickel	4	4	100%	0.013	0.0245	0.02
Potassium	4	4	100%	7	11	8.50
Selenium	4		0%	ĺ		0.01
Silver	4 ]		0%			0.01
Sodium	4	4	100%	16	23	19
Thallium	4		0%			0.01
Vanadium	4	4	100%	0.031	0.0525	0.04
Zinc	4	4	100%	0.042	0.13	0.08
Fluoride (mg/l)	4	4	100%	0.23	0.38	0.31
Hardness as CaCO3 (mg/l)	4 [	4	100%	220	330	256
Ortho-Phosphate-P (mg/l)	4 [	3 (	75%	0.089	0.215	0.12
pH	4	4	100%	7.3	8.1	7.83
Suspended Solids (mg/l)	4	4	100%	270	700	420
Total Dissolved Solids	4	4	100%	310	460	368
Total Phosphorus (mg/l)	4	4	100%	0.87	3	1.64
PCB, ug/l						
Decachlorobiphenyl	4	j	0%	i		0.25
Dichlorobiphenyl	4	ł	0%			0.05
Heptachlorobiphenyl	4		0%			0.15
Hexachlorobiphenyl	4	}	0%			0.10
Monochlorobiphenyl	4	[	0%	[		0.05
Nonachlorobiphenyl	4	,	0%			0.25
Octachlorobiphenyl	4	(	0%	1	į	0.15
Pentachlorobiphenyl	4		0%			0.10
Tetrachlorobiphenyl	4	1	0%	-		0.10
Trichlorobiphenyl	4		0%			0.10
THORIOTOPHOLY:	7	]	0.0	ļ		0.05
Pesticides, ug/l	4		0%			0.05
4,4'-DDE	4	1	25%	0.0015	0.0015	0.03
4,4'-DDT	4	1	25%	0.0013	0.0057	0.04
י טטי ד,ד	4		2070	0.0007	0.0057	0.04

# Reference Area Surface Water Data Summary Sauget Area I

<del></del>	<del></del>	<u> </u>	<del></del>			
	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection			Concentration
Aldrin	4	2	50%	0.0024	0.004	0.01
Alpha Chlordane	4	2	50%	0.0019	0.013	0.02
alpha-BHC	4	1	25%	0.00155		0.02
beta-BHC	4	4	100%	0.0048	0.015	0.01
delta-BHC	4	1	25%	0.007	0.007	0.01
Dieldrin	4	2	50%	0.0021	0.0036	0.03
Endosulfan I	4	4	100%	0.0017	0.026	0.01
Endosulfan II	4	1	25%		0.000096	0.04
Endosulfan sulfate	4	3	75%	0.0028		0.02
Endrin Endrin aldehyde	4	2	50% 25%	0.00048 0.05115		0.03 0.05
Endrin ketone	4	2	50%	0.0047	0.03113	0.03
Garmma Chlordane	4	2	50%			0.03
gamma-BHC (Lindane)	4	4	100%	0.0002	0.0051	0.01
Heptachlor	4	1	25%	0.0035	0.0035	0.02
Heptachlor epoxide	4	4	100%	0.0047	0.0082	0.01
Methoxychlor	4	•	0%	3.0047	3.0002	0.25
Toxaphene	4		0%			2.50
SVOCs, ug/l			<del></del>			
1,2,4-Trichlorobenzene	4		0%			5.00
1,2-Dichlorobenzene	4		0%			5.00
1,3-Dichloroberzene	4		0%			5.00
1,4-Dichlorobenzene	4		0%			5.00
2,2'-Oxybis(1-	4		0%			5.00
2.4.5-Trichlorophenol	4 ,		0%			5.00
2,4,6-Trichlorophenol	4		0%			1.05
2.4-Dichlorophenol	4		0%			5.00
2,4-Dinitrophenol	4		0%			7.00
2.4-Dinitrotoluene	4		0%			5.00
2.6-Dinitrotoluene	•		0% 0%			5.00
-Chloronaphthalene -Chlorophenol	7		0%			5.00 5.00
2-Methylnaphthalene	7		0%			5.00 5.00
-Methylphenol (o-cresol)	7		0%			5.00
2-Nitroaniine	4		0%	1		25
2-Nitrophenol	4		0%			5.00
3.3'-Dichlorobenzidine	4		0%			10
-Methylphenol/4-	4		0%			5.00
-Nitroaniline	4		0%			25
,6-Dinitro-2-methylphenol	4		0%			6.50
-Bromophenylphenyl ether	4		0%			0.50
I-Chloro-3-methylphenol	4		0%			5.00
-Chloroaniline	4		0%			10
-Chlorophenylphenyl ether	4	}	0%			5.00
-Nitroaniline	4	Ì	0%		ļ	25
-Nitrophenol	4		0%			25
cenaphthene	4		0%		j	5.00
cenaphthylene	4		0%			5.00
vnthracene	4	1	0%			5.00
lenzo(a)anthracene	4		0%		ł	5.00
lenzo(a)pyrene	4	:	0%			5.00
lenzo(b)fluoranthene	4		0%		]	5.00
lenzo(g,h,i)perylene	4	;	0%			5.00
lenzo(k)fluoranthene	4		0%			5.00
is(2-	4		0%			5.00
is(2-Chloroethyl)ether	4		0%	ļ	J	5.00
is(2-Ethylhexyl)phthalate	4		0%			0.90
Sutylbenzylphthalate	4		0%			5.00
Carbazole Chosene	4		0%	1	į	5.00 5.00
hrysene	4		0%			5.00

# Reference Area Surface Water Data Summary Sauget Area I

	Ī					
	Number	Number	Frequency of	  Minimum	  Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Di-n-butylphthalate	4		0%			5.00
Di-n-octylphthalate	4		0%			5.00
Dibenzo(a,h)anthracene	4		0%			5.00
Dibenzofuran	4		0%			5.00
Diethylphthalate	1 4		0%			5.00
Dimethylphthalate	4		0%			5.00
Fluoranthene	4		0%		i	5.00
Fluorene	1 4		0%			0.50
Hexachlorobenzene	4		0%		ł	5.00
Hexachlorobutadiene	4		0%			5.00
Hexachlorocyclopentadiene	4		0%			5.00
Hexachloroethane	] 4]		0%			0.95
Indeno(1,2,3-cd)pyrene	4		0%			5.00
Isophorone	4		0%			5.00
N-Nitroso-di-n-propylamine	4		0%			5.00
N-Nitrosodiphenylamine	4		0%			2.50
Naphthalene	4		0%			5.00
Nitrobenzene	4		0%			1.75
Pentachlorophenol	4		0%			2.50
Phenanthrene	4		0%			5.00
Phenol	4		0%			5.00
Pyrene	4		0%			5.00
VOCs, ug/l						
1,1,1-Trichloroethane	4		0%			2.5
1,1,2,2-Tetrachloroethane	4		0%			2.5
1,1,2-Trichloroethane	4		0%	j		2.5
1,1-Dichloroethane	4		0%			2.5
1,1-Dichloroethene	4 ]		0%			2.5
1,2-Dichloroethane	4		0%			2.5
1,2-Dichloropropane	4		0%			2.5
2-Butanone (MEK)	4 [	ſ	0%	ĺ		12.5
2-Hexanone	4		0%			12.5
4-Methyl-2-pentanone	4		0%	ì		12.5
Acetone	4	1	25%	38	38	28
Benzene	4	}	0%	-	ł	0.6
Bromodichloromethane	4		0%			2.5
Bromoform	4	ł	0%	-		2.5
Bromomethane (Methyl	4	ĺ	0%	Ĭ	Ì	4.9
Carbon disulfide	4	1	0%			2.5
Carbon tetrachloride	4		0%			2.5
Chlorobenzene	4 ]	]	0%			2.5
Chloroethane	4		0%[			5
Chloroform	4		0%			2.5
Chloromethane	4	ĺ	0%	ĺ		5
cis-1,3-Dichloropropene	4	· I	0%	l		0.5
Cis/Trans-1,2-	4		0%	i		2.5
Dibromochloromethane	4		0%			2.5
Ethylbenzene	4	1	0%		ľ	2.5
Methylene chloride	4	j	0%		]	2.35
Styrene	4	ļ	0%	ļ		2.5
Tetrachloroethene	4		0%			2.5
Toluene	4	]	0%			2.5
rans-1,3-Dichloropropene	4		0%			2.5
Trichloroethene	4		0%			1.35
Vinyl chloride	4	[	0%	ſ	1	5
Xylenes, Total	4		0%			2.5

Note:

# Reference Area Surface Water Dioxin Data Summary Statistics Sauget Area I

	Number	Number	Emayonayaf	Minimum	Maximum	Avenage
Compounds	Analyzed	Detected	Frequency of Detection	Detected	Detected	Average Concentration
	Allalyzeu	Detected	Detection	Detected	Detected	Concentration
Dioxins and Furans, ug/l						
1,2,3,4,6,7,8,9-OCDD	4	4	100%	2.88E-03	7.40E-03	
1,2,3,4,6,7,8,9-OCDF	4	3	75%	1.23E-04	1.96E-04	
1,2,3,4,6,7,8-HpCDD	4	4	100%	9.59E-05	1.83E-04	
1,2,3,4,6,7,8-HpCDF	4	4	100%	1.47E-05	4.45E-05	
1,2,3,4,7,8,9-HpCDF	4	1	25%	1.19E-05	1.19E-05	
1,2,3,4,7,8-HxCDD	4	2	50%	5.75E-06	8.00E-06	
1,2,3,4,7,8-HxCDF	4		0%			3.20E-06
1,2,3,6,7,8-HxCDD	4	3	75%	9.00E-06	9.80E-06	7.51E-06
1,2,3,6,7,8-HxCDF	4	2	50%	5.30E-06	7.20E-06	4.04E-06
1,2,3,7,8,9-HxCDD	4	3	75%	1.09E-05	1.39E-05	1.00E-05
1,2,3,7,8,9-HxCDF	4	3	75%	7.50E-06	1.27E-05	7.95E-06
1,2,3,7,8-PeCDD	4	2	50%	8.30E-06	8.70E-06	5.32E-06
1,2,3,7,8-PeCDF	4	2	50%	6.80E-06	7.10E-06	4.79E-06
2,3,4,6,7,8-HxCDF	4		0%			3.38E-06
2,3,4,7,8-PeCDF	4	1	25%	5.90E-06	5.90E-06	3.29E-06
2,3,7,8-TCDD	4		0%[	ĺ		1.61E-06
2,3,7,8-TCDF	4	3	75%	5.40E-06	8.35E-06	5.70E-06
Total HpCDD	4	4	100%	2.02E-04	4.04E-04	3.27E-04
Total HpCDF	4	2	50%	8.10E-05	1.52E-04	7.80E-05
Total HxCDD	4	2	50%	6.33E-05	6.43E-05	4.35E-05
Total HxCDF	4	2	50%	2.16E-05	3.68E-05	2.86E-05
Total PeCDD	4	1	25%	8.30E-06	8.30E-06	5.34E-06
Total PeCDF	4	2	50%	1.30E-05	1.64E-05	9.20E-06
Total TCDD	4	3	75%	3.90E-06	1.70E-05	7.35E-06
Total TCDF	4	3	75%	5.40E-06	9.00E-06	5.86E-06

### Note:

#### Comparison of Surface Water Detection Limits to Standards and Guidelines Dead Creek Sector F and Borrow Pit Lake Sauget Area I

i			nois <sup>1</sup>		Criteria <sup>2</sup>	Tier II	Values <sup>3</sup>	Oak Ridge	A COPC		
	Detection	Acute WQ	Chronic WQ	CMC	CCC	Secondary	Secondary	Lowest Chronic Value	for this		}
Compounds	Limit	Standards	Standards			Acute Value	Chronic Value	for All Organisms <sup>4</sup>	Medium?	Why is this a COC?	Comments on Detection Limits
										7.0	CONTROL OF DOLOGICAL ENTED
Herbicides (ug/l)											† - · · · · · · · · · · · · · · · · · ·
2,4,5-T	0.5			-					No		No criteria available to evaluate detection limit.
2,4,5-TP (Silvex)	0.5								No		No criteria available to evaluate detection limit.
2,4-D	0.5								No		No criteria available to evaluate detection limit.
2.4-DB	0.5								No		No criteria available to evaluate detection limit.
Dalapon	120								No	· · · · · · · · · · · · · · · · · · ·	No criteria available to evaluate detection limit.
Dicamba	1.2								No		No criteria available to evaluate detection limit.
Dichloroprop	6								No		No criteria available to evaluate detection limit.
Dinoseb	6		T						No	<del></del>	No criteria available to evaluate detection limit.
MCPA	120			_					No		No criteria available to evaluate detection limit.
MCPP	120				· · · · · · · · · · · · · · · · · · ·				No		
Pentachiorophenol at pH 7.4	1			13	10				No		No criteria available to evaluate detection limit.  Detection limit less than criteria.
Metals/inorganics (mg/l)					1			<del> </del>	140		Detection limit less tran criteria.
Aluminum	All Detected	<b></b>		0.75ª	0.087*				Yes		15
Antimony	0.02			0.73	0.007	0.18	0.03	<del></del>		greater than criteria	Detected in all samples.
		0.36	0.19	0.34	0.15				No		Detection limit less than criteria.
Arsenic	0.01	0.36	0.19	J 0.34	0.15	0.066 <sup>b</sup>	0.0031 <sup>b</sup>		No		Detection limit greater than Tier II values in 1/6
Barium	All Detected	<del></del>	<u> </u>			0.11	0.004	ļ			samples.
		<del> </del>	<del></del>		ļ				Yes	greater than Tier II	Detected in all samples.
Beryllium	0.004		ľ	1		0.035	0.00066		No		Detection limit greater than Tier II chronic value
		<del> </del>	0.0004	0.044	0.0046	<b> </b>	<del> </del>		<u> </u>		in 6/6 samples; source of uncertainty.
Cadmium	0.005	0.024	0.0021	0.011	0.0046	Į	ļ	l	No	1	Detection limit greater than Illinois chronic
			ļ	1	İ	1					standard and the NAWQ CCC in 6/6 samples;
	400 50 10 10 10	<b></b> -	ļ						<u> </u>		source of uncertainty.
Calcium	All Detected	L						116	No		Detected in all samples.
Chromium	0.01	3.3 /0.016	0.39°/0.011°	3.4 / 0.016	0.167 0.0114	<u> </u>			No		Detection limit less than criteria.
Cobalt	0.01	ļ				1.5	0.023		No		Detection limit less than criteria.
Copper	All Detected		0.023	0.029	0.018				No		Detected in all samples.
Cyanide, Total	0.01	0.022	0.0052	0.022	0.0052			1	No		Detection limit greater than chronic values in 6/
i		<u></u>	l.,		1						samples; source of uncertainty.
Iron	All Detected		<u></u>	1	11				Yes	greater than criteria	Detected in all samples.
Lead	0.005	0.26	0.055	0.22	0.0087		L		Yes	greater than NAWQ criteria	Detection limit less than criteria.
Magnesium	All Detected						L	82	No		Detected in all samples.
Manganese	All Detected	Į.			l	2.3	0.12		Yes	greater than criteria	Detected in all samples.
Mercury	0.0002	0.0026	0.0013	0.0014	0.00077		0.0013		No		Detection limit less than criteria.
Molybdenum	0.01					16	0.37	L	No		Detection limit less than criteria.
Nickel	All Detected			0.91	0.1	1	1		No		Detected in all samples.
Potassium	All Detected		1					53	No		Detected in all samples.
Selenium	0.01				0.005				No		Detection limit greater than NAWQ CCC in 6/6
00.01.10.11	"""	1	1	}	j	J	1	J		ļ	samples; source of uncertainty.
Silver	0.01	t	·	0.016			0.00036		No		Detection limit greater than Tier II chronic value
Sive:	""	1			1		1			<b>\</b>	in 6/6 samples.
Sodium	All Detected	t		1	1	I		680	No		Detected in all samples.
Thallium	0.01	<del>†                                     </del>	<del> </del>		1	0.11	0.012	1	No		Detection limit less than criteria.
Vanadium	0.01	1	+	<b></b>	1	0.28	0.02	<u> </u>	No		Detection limit less than criteria.
Zinc	All Detected	1	+	0.23	0.23	† <del></del>	†:- <u>-</u>		No	<u> </u>	Detected in all samples.
	All Detected		+	1		<del>                                     </del>	1	<del> </del>	No		No criteria available to evaluate detection limit
Fluoride (mg/l)	All Delected	'1		1	I				'"	1	water quality parameter.
Hardness as CaCO3 (mg/l)	All Detected	.+	+	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	No		No criteria available to evaluate detection limit
maiuness as CaCO3 (mg/i)	A Delected	' <del> </del>		1	1	1			'**	1	water quality parameter.
Ortho Dheanhate D (	All Detected	<del> </del>	<del> </del>	<del> </del>	+	<del> </del>	<del> </del> -	<del> </del>	No	<del>                                     </del>	No criteria available to evaluate detection limit
Ortho-Phosphate-P (mg/l)	Ail Detected	'1		<b>!</b>	1	ļ	1		'**	1	water quality parameter.
lau	All Detected	<del></del>	+	<del> </del>	6.5 - 9	<del> </del>	· · · · · ·	t	No	<del> </del>	Detected in all samples; water quality parameter
pH		4	+	<del> </del>	0.5-3	<del>                                     </del>	<del> </del>	<del> </del>	No		No criteria available to evaluate detection limit
Suspended Solids (mg/l)	5	1		1	i	1			l No	i	water quality parameter.
	All Date -1-	.+	<del> </del>	<del></del>	+	<del> </del>	<del> </del>	<del></del>	No	<del>                                     </del>	No criteria available to evaluate detection limit
Total Dissolved Solids (mg/l)	All Detected	'l		1	1	1	1		] NO		water quality parameter.
<u></u>	A	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	No		No criteria available to evaluate detection limit
Total Phosphorus (mg/l)	All Detected	'I		1	1	1	1		l vo		water quality parameter.
			,							1	I WALE: UUdiily Dalai Reiël.

Appendix C-1 9

Comparison of Surface Water Detection Limits to Standards and Guidelines
Dead Creek Sector F and Borrow Pit Lake
Sauget Area I

,			role'		Cutéus,	] THEFT	Values"	Oak Hidge	A COPC		
	Detection	Acute WO	Chronic WQ	CMC	CCC	Becondary	Becondery	Lowest Chronic Value	for this		
Compounds	Limit	Standards	Blandards	ļ		Acute Value	Chronic Value	for All Organisms*	Medium?	Why is this a COC?	Comments on Detection Limits
PCB (ug/l)					0.014						
Decachlorobiphenyl	0.5				l	1	1		No		Detection limit greater than NAWG CCC for
			l i			ļ					PCBs in 6/6 samples, source of uncertainty
Dichlorobiphenyl	0.1	1				]			No	•	Detection limit greater than NAWO CCC for
						Į.					PCBs in 6/6 samples, source of uncertainty
Heptachlorobiphenyl	0.3	1				1			No		Detection limit greater than NAWQ CCC for
Hexachlorobiphenyl	0.2		1				1		No		PCBs in 6/6 samples; source of uncertainty Detection limit greater than NAWQ CCC for
The second secon	J.2		1			ŀ			'**		PCBs in 6/6 samples; source of uncertainty
Monochlorobiphenyl	0.1	Į.	1						No		Detection limit greater than NAWO CCC for
		,					1				PCBs in 6/6 samples, source of uncertainty.
Nonachlorobiphenyl	0.5	l				İ	1		No		Detection limit greater than NAWQ CCC for
0-4	0.3					1					PCBs in 6/6 samples, source of uncertainty
Octachlorobiphenyl	0.3								No		Detection limit greater than NAWQ CCC for PCHs in 6/6 samples, source of uncertainty
Pentachlorobiphenyl	0.2	i	1		i	ì			No		Detection limit greater than NAWQ CCC for
			1			1			'		PCBs in 6/6 samples, source of uncertainty
Tetrachlorobiphenyl	0.2	ĺ	; i			1			No		Detection limit greater than NAWQ CCC for
·		l	ļ .			1	ļ.		l		PCBs in 6/6 samples, source of uncertainty
Trichlorobiphenyl	0.1		<b>{</b>			1	1		No		Detection limit greater than NAWQ CCC for
	}	ł	<b> </b>		ł		ł				PCBs in 6/6 samples, source of uncertainty
Posticides (ug/l)	ł	ł	† !		Ì				ì		
4,4'-DDD	0.1	1	1		İ	0.19	0 011		No		Detection limit greater than Tier II chronic value
		1	l l		1	1	ł		1		in 6/6 samples; source of uncertainty
4,4'-DDE	0.1	Ţ	! !		j	1	[		No		No criteria available to evaluate detection limit
4,4'-DDT	0.1	ł	<u> </u>	1.1	0 001		0 0 1 3'		No		Detection limit greater than CCC and Tier II
								ŀ		į.	chronic value in 6/6 samples, source of uncertainty.
Aldrin	0.05	t		3	ł	ì	ł	i	No		Detection limit less than criteria
Alpha Chlordane	0.08	1	i i	2.4*	0.0043*	t	Ì	1	No		Detection limit greater than NAWQ CCC in 6/6
	1		i I		0.0043	İ	1	[	1		samples; source of uncertainty
alpha-BHC	0.039	j	i I		]	39^	2.2		No		Detection limit less than criteria
bela-BHC	0 0 1 4					39^	2.2 <sup>h</sup>		No	]	Detection limit less than criteria.
delta-BHC	0.012	ŀ			1	36,	2.2 <sup>h</sup>	ļ	No		Detection limit less than criteria.
Dieldrin	0.1			0.24	0.056		i	ł	No		Detection limit greater than NAWQ CCC in 5/6
		1	}			1		ļ.	l No		samples, source of uncertainty.  Detection limit less than criteria.
Endosulfan I	0.05	1		0.22	0.056		0.61		No.		Detection limit greater than NAWQ CCC in 6/6
Endosulfan II	0.1		1	0 22'	0.056		0.81		140		samples; source of uncertainty.
Endosulfan sulfate	0.1	1				İ	İ		Yes	no criteria	No criteria available to evaluate detection limit.
Endrin	0.1	l .	l i	0.066	0.036	i	Į	Ī	No	Į.	Detection limit greater than NAWQC in 5/6
		Ī						!	1		samples; source of uncertainty.
Endrin aldehyde	0.1	1			1	1	ļ		Yes	no criteria	No criteria available to evaluate detection limit.
Endrin ketone	0.1	I					1	1	Yes	no criteria	No criteria available to evaluate detection limit.  Detection limit greater than NAWQ CCC in 6/6
Gamma Chlordana	0.08			2.4*	0,0043°				NO		samples; source of uncertainty.
gamma-BHC (Lindane)	0.019			0.96	1	1		1	No	1	Detection limit less than criteria.
Heptachior	0.08			0.62	0.0036	0.125	0.0069	!	No	Ī	Detection limit greater than CCC and Tier II
repart not											chronic value in 3/6 samples; source of
		]	[					1	l	Į.	uncertainty.
Heptachior epoxide	0.05		]	0.52	0.0038				No		Detection limit greater than NAWQ CCC in 4/6 samples; source of uncertainty.
					0.03		0.019		No		Detection limit greater than CCC and Tier II
Methoxychlor	0.5				0.03		0.019		"		chronic value in 6/6 samples; source of
i									l	1	uncertainty.
			1		1	1	1		No	1	Detection limit greater than NAWQC in 6/6
Toxaphene	6	1		0.73	0.0002			1	NO		samples; source of uncertainty.

#### Comparison of Surface Water Detection Limits to Standards and Guidelines Dead Creek Sector F and Borrow Pit Lake Sauget Area I

		Illir	nois¹	NAWQ Crit	teria <sup>2</sup>	Tier II	Values <sup>3</sup>	Oak Ridge	A COPC		
	Detection		Chronic WQ	CMC	CCC	Secondary	Secondary	Lowest Chronic Value	for this		
Compounds	Limit	Standards	Standards			Acute Value	Chronic Value	for All Organisms <sup>4</sup>	Medium?	Why is this a COC?	Comments on Detection Limits
SVOC (ug/l)											
1,2,4-Trichlorobenzene	10	L				700	110		No		Detection limit less than criteria.
1,2-Dichlorobenzene	10					260	14		No		Detection limit less than criteria.
1,3-Dichlorobenzene	10					630	71		No		Detection limit less than criteria.
1,4-Dichlorobenzene	10					180	15		No		Detection limit less than criteria.
2,2'-Oxybis(1-Chloropropane)	10	ļ		<u> </u>	_	i			No		No criteria available to evaluate detection limits.
2,4,5-Trichlorophenol	10	<u> </u>		<u> </u>					No		No criteria available to evaluate detection limits.
2,4,6-Trichlorophenol	2.1		l			<b></b>			No		No criteria available to evaluate detection limits.
2,4-Dichlorophenol	10	ļ		<u> </u>		<u> </u>			No		No criteria available to evaluate detection limits.
2,4-Dinitrophenol	14	<b>-</b>				<u> </u>			No		No criteria available to evaluate detection limits.
2,4-Dinitrotoluene	10	ļ				ļ			No		No criteria available to evaluate detection limits.
2,6-Dinitrotoluene	10	<b>ļ</b>	ļ	ļ		ļ			No		No criteria available to evaluate detection limits.
2-Chloronaphthalene	10	<b>.</b>		<u> </u>		<b>!</b>			No		No criteria available to evaluate detection limits.
2-Chiorophenol	10			ļ		<u> </u>			No		No criteria available to evaluate detection limits.
2-Methylnaphthalene	10	<b>-</b>		<b></b> _		L			No		No criteria available to evaluate detection limits.
2-Methylphenol (o-cresol)	10	ļ. ———		<del></del>		230	13		No		Detection limit less than criteria.
2-Nitroaniline	50	<u> </u>				<u> </u>			No		No criteria available to evaluate detection limits.
2-Nitrophenol	10	<del> </del>	l — —	<b> </b>		<del> </del>	ļ		No		No criteria available to evaluate detection limits.
3,3'-Dichlorobenzidine	20	ļ							No		No criteria available to evaluate detection limits.
3-Methylphenol/4-Methylphenol	10	ļ		<del></del>		ļ			No		No criteria available to evaluate detection limits.
3-Nitroaniline	50	L	<u> </u>	<b></b>		<b> </b>			No		No criteria available to evaluate detection limits.
4,6-Dinitro-2-methylphenol	13	<b></b>		<b> -</b>		<del> </del>			No		No criteria available to evaluate detection limits.
4-Bromophenylphenyl ether	1 1	<b>└</b>		l		<del> </del>	1.5		No		Detection limit less than criteria.
4-Chioro-3-methylphenol	10	ļ		<b> </b>				<b>_</b>	No		No criteria available to evaluate detection limits.
4-Chloroaniline	20	Ļ		<del> </del>		<del> </del>			No		No criteria available to evaluate detection limits.
4-Chlorophenylphenyl ether	10			<b> </b>		ļ			No		No criteria available to evaluate detection limits.
4-Nitroaniline	50			<b> </b>		<del> </del>			No		No criteria available to evaluate detection limits.
4-Nitrophenol	50	<b></b>	L	L		1200	300		No		Detection limit less than criteria.
Acenaphthene	10	<b>{</b>	<b>_</b>	<b></b>		<del></del>		74	No		Detection limit less than criteria.
Acenaphthylene	10		ļ	I		<del> </del>		L	No		No criteria available to evaluate detection limits.
Anthracene	10	i		ļ !		13	0.73		No	1.	Detection limit greater than Tier II chronic value
	<del> </del>	<del></del>	<u> </u>			<del> </del>			<del> </del> _		in 6/6 samples; source of uncertainty.
Benzo(a)anthracene	10	1		<b>)</b>		0.49	0.027	ĺ	No	ł	Detection limit greater than Tier II values in 6/6
	<u> </u>		L						L		samples; source of uncertainty.
Benzo(a)pyrene	10	1	1	1 1		0.24	0.014		No	1	Detection limit greater than Tier II values in 6/6
	<del></del>	<b>↓</b>	ļ <u>-</u>	<b>_</b>		ļ <u>.</u>			<del> </del> -		samples; source of uncertainty.
Benzo(b)fluoranthene	10	<del></del>		ļ		ļ			No	<u> </u>	No criteria available to evaluate detection limits.
Benzo(g,h,i)perylene	10			<del> </del>		<del> </del>			No		No criteria available to evaluate detection limits.
Benzo(k)fluoranthene	10		ļ	ļ		<b>_</b>	<u> </u>		No	·	No criteria available to evaluate detection limits.
bis(2-Chloroethoxy)methane	10	<del></del>	L	<b></b>		ļ. <u>.                                   </u>		ļ	No	<b>-</b>	No criteria available to evaluate detection limits.
bis(2-Chloroethyl)ether	10	J	<u> </u>	<del> </del>		<u> </u>			No	<del>                                     </del>	No criteria available to evaluate detection limits.
bis(2-Ethylhexyl)phthalate	1.8	<u> </u>	<del>                                     </del>	<del> </del>		27	3		No		Detection limit less than criteria.
Butylbenzylphthalate	10	<b></b> _	<del> </del>	<del> </del>		<b></b>	19	ļ	No	<del> </del>	Detection limit less than criteria.
Carbazole	10	<b></b>	<del> </del>	<del>                                     </del>		<del></del>	<del>                                     </del>	<del> </del>	No	<del></del>	No criteria available to evaluate detection limits.
Chrysene	10	<del> </del>	1	<del> </del>		+		<del> </del>	No No	<del></del>	No criteria available to evaluate detection limits.
Di-n-butylphthalate	10	4	<del> </del>	<del>                                     </del>		190	35	700		<del>                                     </del>	Detection limit less than criteria.
Di-n-octylphthalate	10	<b>↓</b>	<del> </del>	<del>   </del>		<del> </del>	<del> </del>	708	No	<del> </del>	Detection limit less than criteria.
Dibenzo(a,h)anthracene	10	<del> </del>	<b></b>	<del>                                     </del>		<del> </del>	<del> </del>	<del> </del>	No No	<del>                                     </del>	No criteria available to evaluate detection limits.
Dibenzofuran	10	1	1	1		66	3.7	1	NO	Į.	Detection limit greater than Tier II chronic value
	<del> </del>	<b>↓</b>	<del> </del>	<del> </del>		1000	210	<del> </del>	No	<del> </del>	in 6/6 samples; source of uncertainty.  Detection limit less than criteria.
Diethylphthalate	10	<del></del>		<del> </del>		1800	<u>∠10</u>	<del> </del>	No No	<del></del>	No criteria available to evaluate detection limits.
Dirnethylphthalate	10	<del></del>	<del></del>	<b>├</b> ────		<del> </del>	<del> </del>	15	No No	<del> </del>	Detection limit less than criteria.
Fluoranthene	10	+	<del> </del>	<del> </del>		<del>  70</del> -	<del> </del>	15		<del> </del>	
Fluorene	1	4	<del> </del>	<del> </del>		70	3.9	<del> </del>	No	<del></del>	Detection limit less than criteria.
Hexachlorobenzene	10	<del></del>	<del> </del>	<del>                                     </del>		<del> </del>		<del> </del>	No	<del> </del>	No criteria available to evaluate detection limits.
Hexachlorobutadiene	10	<b>├</b>	<del> </del>	<del>                                     </del>		+	<del></del>	<del> </del>	No	<del> </del>	No criteria available to evaluate detection limits.  No criteria available to evaluate detection limits.
Hexachlorocyclopentadiene	10	<b>├</b>	<del></del>	<del> </del>		+ ===	<del> </del>	<del> </del>	No		
Hexachloroethane	1.9	<b>↓</b>		<del>                                     </del>		210	12	<del> </del>	No	<del> </del>	Detection limit less than criteria.
Indeno(1,2,3-cd)pyrene	10	<b></b>	<del> </del>	<b>∤</b>		<del> </del>	<del> </del>	<del> </del>	No	ļ <u>-</u>	No criteria available to evaluate detection limits.
Isophorone	10	1						L	No	L	No criteria available to evaluate detection limits.

# Correspond of Burlace Water Detection Limits to Blandards and Guidelines Dead Creek Bactor F and Borrow Pil Lake Baugel Area I

						9	augel Area I				
	Detection		nois¹   Chronic WG	NAWQ CMC	Criterie <sup>®</sup>	Tier III Secondary	Values <sup>3</sup>	Oak Ridge	A COPC		
Compounds	Fruit	Standards		CINC	CCC	Acute Value	Secondary Chronic Value	Lowest Chronic Value for All Organisms*	for this	Why is this a COC?	Comments on Detection Limits
N-Nitroso-di-n-propylamine	10					1.00.0	0.110-110-10-00		No		No criteria available to evaluate detection limits.
N-Nitrosodiphenylamine	5		l l			3800	210		No	Į.	Detection limit less then criteria detection limits
Nachthalene	10		1			190	12		No		Detection limit less than criteria
Nitrobenzene	3.5		1 1		İ				No		1
Pentachtorophenol	6		1 1		Ĭ				No		No criteria available to evaluate detection limits
Phenenthrene	10		i I					200	No.		No criteria available to evaluate detection limits
Phenoi	10	Į.	1 1		Į.	l		<b>₹200</b>	No.		Detection limit less than criteria.
Pyrene	10	1	1 1				1	1200	No No	ł	Detection limit less than criteria.
1,,,,,,,			i i		1				1700	ł	No criteria available to evaluate detection limits
VOC (ug/l)			ļ j		ļ					[	· †
1,1,1-Trichloroethane	5		i 1		ļ	200	11		No	ŀ	Detection limit less than criteria
1,1,2,2-Teirschloroethene	5					2100	610	ĺ	No		Detection limit less than criteria
1,1,2-Trichloroethane	5				i	5200	1200		No		Detection limit less than criteria
1,1-Dichloroethane	5		1		1	830	47		No	t	Detection limit less than criteria
1,1-Dichloroethene	5		1		1	450	25		No	ł	Detection limit less than criteria
1,2-Dichloroethane	5	1			ł	8800	910		No	ł	Detection limit less than criteria
1,2-Dichloropropene	5	1	i I		l	1			No.	ŀ	No criteria available to evaluate detection limit
2-Bulanone (MEK)	26	1			1	240000	14000		No	ł	Detection limit less than criteria
2-Hexanone	25	1	j		1	1800	99		No.	ł	Detection limit less than criteria
4-Methyl-2-pentanone (MiBK)	25	1	<b> </b>		i	2200	170		No.	ł	Detection limit less than criteria.
Acetone	50		1			28000	1500		No		
Benzene	12	ļ	1 1			2300	130		No.	1	Detection limit less than criteria Detection limit less than criteria
Bromodichioromethene	5		i I			2300	130		No.	ŀ	a control of the second
Bromoform	6		1			1	!			}	No criteria available to evaluate detection limit
Bromomethene (Methyl bromide)	9.8		Į I				1		No No	1	No criteria available to evaluate detection limit
						l					No criteria available to evaluate detection limit
Carbon disulfide						17	0.92		No		Detection limit greater than Tier II chronic value
C	5	ł	1							l.	in 6/6 samples; source of uncertainty
Carbon tetrachloride	_	ł	! !			180	9.6	ļ	No	1	Detection limit less than criteria
Chlorobenzene	8	ł .	1		1	1100	64		No	1	Detection limit less than criteria
Chloroethane	10	l	1		1		Į.	ļ	No		No criteria available to evaluate detection limit
Chloroform	5		! !		Į.	490	26	ļ	No	<u> </u>	Detection limit less than criteria
Chloromethane	10	ļ	ļ <u></u>		ļ	1	Į.	<u> </u>	No	!	No criteria available to evaluate detection limit.
cis-1,3-Dichloropropene	1		1			0.99	0 055		No		Detection limit greater than Tier II values in 6/6
		I	1. 1			1		1	l		samples; source of uncertainty.
Cis/Trans-1,2-Dichloroethene	Б —	l .	1 1		1	1100	590	1	No		Detection limit less than criteria
Dibromochloromethane	5	[	1		]	1	I		No	I	No criteria available to evaluate detection limit.
Ethylbenzene	6	I	I I		i	130	7.3	I	No	_	Detection limit less than criteria.
Methylene chloride (Dichloromethane)	4.7	Ĭ	i I		1	26000	2200	1	No	<u>l</u> '	Detection limit less than criteria
Styrene	6	i	i .		1		1	Ī	No	1	No criteria available to evaluate detection limit.
Tetrachloroethene	6	· .	i . i			830	96	İ	No	1	Detection limit less than criteria.
Toluene	6	ľ	į <b>i</b>		1	120	9.8	ľ	No	i	Detection firmit less than criteria.
trans-1.3-Dichloropropene	i -	1 .			Ì	0.99	0.088	i	No	i	Detection limit greater than Tier II values in 6/6
	_	1	1 1			",""	0.000		1		samples; source of uncertainty.
Trichloroethene	2.7	1	i I		İ	440	47		No	†	Detection limit less than criteria.
Vinyl chloride	10	1	1 1		1	'''	"	]	No	İ	No criteria available to evaluate detection limit.
Xylenes, Total		1	1 1		t	2301/32	131/ 1.8		No	İ	Detection limit greater than Tier II chronic value
Ayrenes, rotal	•	1	1			230 / 32	13/1.0		'**	į	in 6/6 samples; source of uncertainty.
· · ·	-	1	1 1		t	1	1		1	İ	1 .
Dioxine (ug/l)		1.	1 1		t	1	1	Ì	İ	1	er er e er e e e e e e e
1,2,3,4,6,7,8,9-OCDD	All Delected	1	1 1			1	1	Ì	Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,4,8,7,8,0,000F	All Detected		1	·			<b>!</b>	ł	Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,4,6,7,6,9-OCDF	All Detected		<del> </del>				<b>∮</b>		Yes	ICOPC in sediment	No criteria available to evaluate detection limit.
1,2,3,4,6,7,8-HpCDD	All Detected		<del> </del>		t	<del></del>	<del> </del>	ł	Yes	COPC in sediment	No criteria avallable to evaluate detection limit.
1,2,3,4,8,7,8-HpCDF		<del> </del>	<del>                                     </del>		<del> </del>		<del> </del>			COPC in sediment	No criteria avallable to evaluate detection limit.
1,2,3,4,7,8,9-HpCDF	1.28E-06	<del> </del>	<del> </del>			<del></del>	ł		Yes		
1,2,3,4,7,8-HxCDD	8.80E-06	<del> </del>	<b>├</b> ──		<b> </b>	<b></b>	<del> </del>	<b> </b>	Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,4,7,8-HxCDF	8.30E-06	ļ	<b></b>		<b></b>	<del> </del>	<del></del>	<b></b>	Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,6,7,8-HxCDD	8.20E-06	<b>}</b>	<del>                                     </del>		<del> </del>	·	<b>+</b>	<del> </del>	Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,8,7,8-HxCDF	7.70E-06	<del> </del>	<b>↓</b>		ļ	<del></del>	ļ	ļ	Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,7,8,9-HxCDD	8.50E-06	<b> </b>	<b>  </b>		ļ				Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,7,6,9-HxCDF	9.20E-06	1			L	.l. <u>.</u>	L	L	Yes	COPC in sediment	No criteria available to evaluate detection limit.

#### Comparison of Surface Water Detection Limits to Standards and Guidelines Dead Creek Sector F and Borrow Pit Lake Sauget Area I

		Illin	nois	NAWQ Criteria <sup>2</sup>		Tier II	Values <sup>3</sup>	Oak Ridge	A COPC		<del></del>
[	Detection	Acute WQ	Chronic WQ	CMC	CCC	Secondary	Secondary	Lowest Chronic Value	for this		
Compounds	Limit	Standards	Standards	{		Acute Value	Chronic Value	for All Organisms	Medium?	Why is this a COC?	Comments on Detection Limits
1,2,3,7,8-PeCDD	8.70E-06								Yes	COPC in sediment	No criteria available to evaluate detection limit.
1,2,3,7,8-PeCDF	6.00E-06								Yes	COPC in sediment	No criteria available to evaluate detection limit.
2,3,4,6,7,8-HxCDF	8.20E-06					.[			Yes	COPC in sediment	No criteria available to evaluate detection limit.
2,3,4,7,8-PeCDF	6.30E-06								Yes	COPC in sediment	No criteria available to evaluate detection limit,
2,3,7,8-TCDD	9.00E-06								Yes	COPC in sediment	No criteria available to evaluate detection limit.
2,3,7,8-TCDF	8.80E-06					1			Yes		No criteria available to evaluate detection limit.
Total HpCDD	All Detected								Yes		No criteria available to evaluate detection limit.
Total HpCDF	All Detected					1			Yes		No criteria available to evaluate detection limit.
Total HxCDD	8.50E-06								Yes		No criteria available to evaluate detection limit.
Total HxCDF	8.30E-06								Yes		No criteria available to evaluate detection limit.
Total PeCDD	8.70E-06								Yes	COPC in sediment	No criteria available to evaluate detection limit.
Total PeCDF	6.20E-06								Yes	COPC in sediment	No criteria available to evaluate detection limit.
Total TCDD	9.00E-06								Yes	COPC in sediment	No criteria available to evaluate detection limit.
Total TCDF	8.80E-06					1			Yes	COPC in sediment	No criteria available to evaluate detection limit.
Total TEQ (mammal)	NA						3.1E-09		Yes	greater than Great Lakes Tier II	

#### Notes:

\*Criterion is for total recoverable Aluminum at pH 6.5 - 9.0; USEPA says Water-Effects ratios may be more appropriate.

<sup>b</sup>Criterion is for Arsenic V

<sup>c</sup>Criterion is for Chromium III

<sup>4</sup>Criterion is for Chromium VI

\*Criterion is for Chlordane

Criterion is for alpha- and beta-Endosulfan

<sup>9</sup>Criterion is for PCBs

<sup>h</sup>Criterion is for BHC forms other than gamma-BHC

Criterion is for DDT

Criterion is for 1,3-Dichloropropene

<sup>k</sup>Criterion is for Xylene

Criterion is for m-Xylene

1 Illinois, 1999. Title 35 of the Illinois Administrative Code, Subtitle C, Chapter I, Part 302 Water Quality Standards, Subpart B.

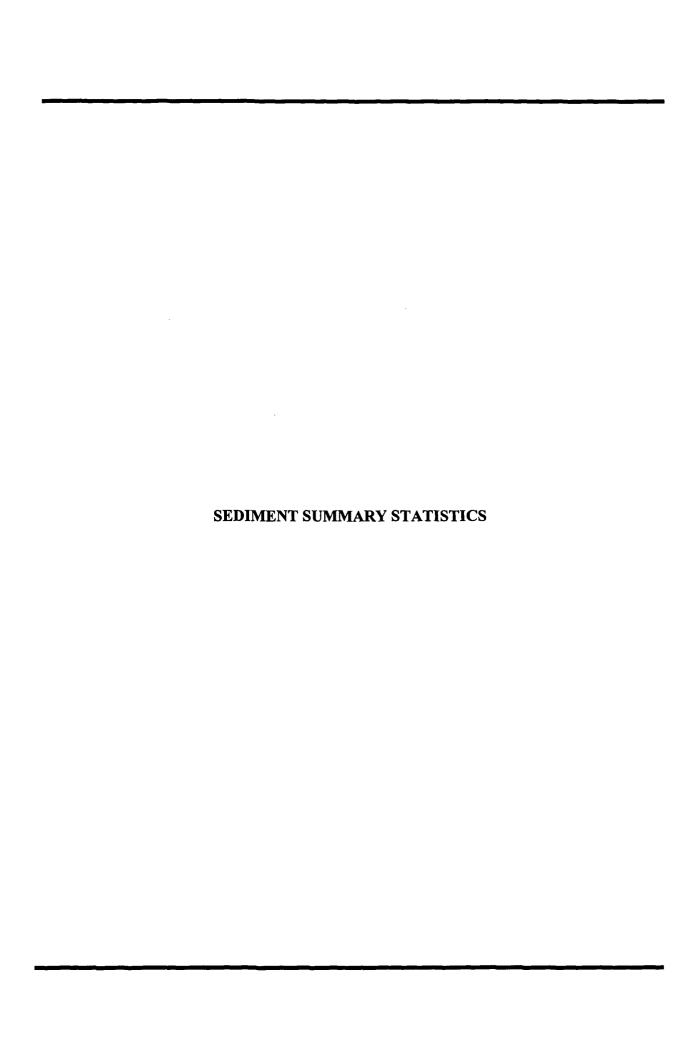
<sup>2</sup> USEPA, 1999. National Recommended Water Quality Criteria - Correction, Office of Water, EPA 82-2-Z-99-001 (April 1999)

Hardness dependent criteria calculated at a hardness of 220 mg/l as CaCO<sub>3</sub> (the lowest detected on site)

Bold indicates detection limit exceeds screening benchmark.

Results in ug/l for organic constituents; mg/l for inorganic constituents

<sup>&</sup>lt;sup>3</sup> Suter, G.W. II, and C.L. Tsao, 1996. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effect on Aquatic Biota: 1996 Revision. Risk Assessment, Health Sciences Research Division, Oak Ridge, Tennessee, ES/ER/TM-96/R2.



Appendix C-2.1

Sediment Summary Statistics for Dead Creek Section F and Borrow Pit Lake Sauget Area I

	Number	Number	Frequency Of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/kg		i	1			
2,4,5-T	∫ 6		0%	İ		38
2,4,5-TP (Silvex)	6		0%	}		38
2,4-D	∫ 6	3	50%	8.8	23	38
2,4-DB	6		0%			38
Dalapon	6		0%	1		304
Dicamba	.] 6		0%	}		89
Dichloroprop	6		0%	[	!	452
Dinoseb	6		0%			452
MCPA	. 6		0%	ļ		8,942
MCPP	6		0%			8,942
Pentachlorophenol	6		0%			64
Inorganics, mg/kg		-	]			
Aluminum	6	6	100%	7,800	17,000	13,300
Antimony	6	5	83%	1.5	4.7	2.7
Arsenic	6	6	100%	8.0	19	15
Barium	6	6	100%	150	420	287
Beryllium	6	6	100%	0.53	0.89	0.74
Cadmium	6	6	100%	1.6	47	12
Calcium	6	6	100%	11,000	17,000	13,167
Chromium	6	6	100%	18	38	25
Cobalt	6	6	100%	5.5	13	9.4
Copper	6	6	100%	36	410	159
Cyanide, Total	6		0%			0.83
Iron	6	6	100%	14,000	38,000	27,333
Lead	6	6	100%	34	320	114
Magnesium	6	6	100%	3,600	6,800	5,033
Manganese	6	6	100%	170	1,400	758
Mercury	6	6	100%	0.10	1.1	0.37
Molybdenum	6 (	6	100%	0.37	3.7	1.2
Nickel	6	6	100%	35	390	134
Potassium	6	6	100%	1,500	2,900	2,183
Selenium	6	. 1	0%			1.6
Silver	6	1	17%	0.79	0.79	1.5
Sodium	6		0%			113
Thallium	6	_	0%			1.6
Vanadium	6	6	100%	25	51	37
Zinc	6	6	100%	250	3,700	1,197
рН	6	6	100%	6.7	7.06	6.9
Total Organic Carbon (mg/kg dry weight)	6	6	100%	33,000	140,000	64,333
PCBs, ug/kg	_ 1		***			[
Decachlorobiphenyl	6	ļ	0%			56
Dichlorobiphenyl	6	ł	0%			11
Heptachlorobiphenyl	6		0%			33
Hexachlorobiphenyl	6	2	33%	17	22	25
Monochlorobiphenyl	6		0%			11
Nonachlorobiphenyl	6		0%			56
Octachlorobiphenyl	6	_	0%			33
Pentachlorobiphenyl	6	2	33%	61	66	39
Tetrachlorobiphenyl	6		0%			22
Trichlorobiphenyl	6	ا ۗ	0%	ا مم		11
Total PCBs	6	2	33%	83	83	57
Pesticides, ug/kg	اء	ا ر	4=01			
4,4'-DDD	6	1	17%	3.8	3.8	9.8
4,4'-DDE	6	6	100%	1.1	11	4.6
4,4'-DDT	6	3	50%	1.1	4.5	7.7
Total DDT	6	6	100%	2.2	43	18
Aldrin	6	1	17%	4.1	4.1	5.4
Alpha Chlordane	6	6	100%	0.48	5.3	2.6

Appendix C-2.1

Sediment Summary Statistics for Dead Creek Section F and Borrow Pit Lake Sauget Area I

Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
alpha-BHC	6		0%			1.6
beta-BHC	6		0%			1.6
delta-BHC	6	1	17%	0.34	0.34	1.5
Dieldrin	6	4	67%	0.26	9.3	6.3
Endosulfan I	6	6	100%	1.0	5.7	2.9
Endosulfan II	6	3	50%	1.8	8.1	6.8
Endosulfan sulfate	6	3	50%	1.4	9.5	8.7
Endrin	6	2	33%	1.7	1.7	7.7
Endrin aldehyde	6	6	100%	1.2	14	5.2
Endrin ketone	6	4	67%	0.7	10	6.7
Gamma Chlordane	6	5	83%	0.74	17	5.9
gamma-BHC (Lindane)	6	1	17%	4.8	4.8	5.6
Heptachlor	6	1	17%	0.93	0.93	4.5
Heptachlor epoxide	6	3	50%	0.51	5.4	4.9
Methoxychlor	6	3	50%	7.3	24	30
Toxaphene	<del>                                     </del>		0%			535
<b>\$VOCs, ug/kg</b> 1,2,4-Trichlorobenzene	6		0%			279
1,2-4- i richioroberizene	6		0%			279 279
1,3-Dichloroberzene	6		0%			279
1.4-Dichlorobenzene	6		0%			279 279
2.2'-Oxybis(1-Chloropropane)	6		0%			279
2.4,5-Trichlorophenol	6		0%	l	i	279
2,4,6-Trichlorophenol	6		0%		ľ	279
2.4-Dichlorophenol	6		0%			279
2,4-Dinitrophenol	6		0%			1,400
2,4-Dinitrotoluene	6		0%			279
2,6-Dinitrotoluene	6	ł	0%			279
2-Chloronaphthalene	6		0%			279
2-Chlorophenol	6	j	0%			279
2-Methylnaphthalene	6		0%			279
2-Methylphenol (o-cresol)	6		0%			279
2-Nitroaniline	6		0%			1,400
2-Nitrophenol	6		0%			279
3,3'-Dichlorobenzidine	6		0%			538
3-Methylphenol/4-Methylphenol	6		0%	ı		279
3-Nitroaniine	6	ł	0%		İ	1,400
4,6-Dinitro-2-methylphenol	6	i	0%			1,400
4-Bromopherrylpherryl ether	6		0%			279
4-Chloro-3-methylphenol 4-Chloroaniline	0		0% 0%			279
4-Chlorophenylphenyl ether	6 6		0%			538 279
4-Nitroaniine	6		0%			1,400
4-Nitrophenol	6	1	0%			1,400
Acenaphthene	6	i	0%			279
Acenaphthylene	6		0%			279
Anthracene	6		0%			279
Benzo(a)anthracene	6		0%			279
Benzo(a)pyrene	6		0%			148
Benzo(b)fluoranthene	6	i	0%			279
Benzo(g,h,i)perylene	6	ŀ	0%			279
Berizo(k)fluoranthene	6		0%			279
bis(2-Chloroethoxy)methane	6		0%			279
bis(2-Chloroethyl)ether	6		0%			279
bis(2-Ethythexyl)phthalate	6		0%			279
Butylbenzylphthalate	6		0%			279
Carbazole	6		0%			279
Chrysene	6	1	17%	74	74	258
Di-n-butylphthalate	_ 6		0%			279

# Sediment Summary Statistics for Dead Creek Section F and Borrow Pit Lake Sauget Area I

Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
Di-n-octylphthalate	6	"	0%			279
Dibenzo(a,h)anthracene	6		0%			148
Dibenzofuran	6	į	0%			279
Diethylphthalate	6		0%		j	279
Dimethylphthalate	6		0%			279
Fluoranthene	6	2	33%	120	130	236
Fluorene	~ 6 l		0%	120	100	279
Hexachlorobenzene	6		0%			114
Hexachlorobutadiene	6	,	0%			279
Hexachlorocyclopentadiene	6		0%			279
Hexachloroethane	1 6		0%			279
Indeno(1,2,3-cd)pyrene	6		0%			279 279
Isophorone	6		0%			279
N-Nitroso-di-n-propylamine	-) 1		0%			
	6					279
N-Nitrosodiphenylamine	6		0%	<u>'</u>		279
Naphthalene	6		0%		ļ	279
Nitrobenzene	6		0%			279
Pentachlorophenol	[6]		0%			1,400
Phenanthrene	] 6]		0%		}	279
Phenol	6		0%			279
Pyrene	6		0%			279
Total PAHs	6	2	33%	194	440	300
VOCs, ug/kg	1 _1					
1,1,1-Trichloroethane	[ 6		0%			14
1,1,2,2-Tetrachloroethane	6		0%			14
1,1,2-Trichloroethane	6		0%			14
1,1-Dichloroethane	6	l	0%			14 [
1,1-Dichloroethene	6	ì	0%			13
1,2-Dichloroethane	] 6]	j	0%			14
1,2-Dichloropropane	6		0% (			14
2-Butanone (MEK)	6	ļ	0%			67
2-Hexanone	6		0%	'		67
4-Methyl-2-pentanone (MIBK)	6	Í	0% {			67
Acetone	[ 6]		0%			138
Benzene	6	İ	0%			14
Bromodichloromethane	6		0%			14
Bromoform	6		0%			14
Bromomethane (Methyl bromide)	6		0%	l		27
Carbon disulfide	6		0%			14
Carbon tetrachloride	6 [	· · · · · · · · · · · · · · · · · · ·	0% {			14 (
Chlorobenzene	6	1	0%			14
Chloroethane	6		0%			27
Chloroform	6	1	0%			14
Chloromethane	6		0%			27
cis-1,3-Dichloropropene	6	İ	0%	ı		11
Cis/Trans-1,2-Dichloroethene	6	j	0%			14
Dibromochloromethane	6	ļ	0%			14
Ethylbenzene	6	1 (	17%	11	11	13
Methylene chloride (Dichloromethane)	6	1	0%			14
Styrene	6	ľ	0%			14
Tetrachloroethene	6	- 1	0%			14
Toluene	6	1	0%			14
trans-1,3-Dichloropropene	6	Į	0%			11
Trichloroethene	6	1	0%		ļ	14
Vinyl chloride	6	l	0%		ľ	27
Xylenes, Total	6	l	0%			14
Aylonos, rotal			U /0			

Note:

Appendix C-2.2

Site Sediment Dioxin Summary Statistics Creek Sector F and Borrow Pit Lake
Sauget Area I

						- 17
Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dioxins and Furans, ug/kg				·		
1,2,3,4,6,7,8,9-OCDD	6	6	100%	8.63E+00	8.84E+01	3.60E+01
1,2,3,4,6,7,8,9-OCDF	6	6	100%	2.35E-01	3.26E+01	1.14E+01
1,2,3,4,6,7,8-HpCDD	6	6	100%	2.38E-01	9.44E+00	3.17E+00
1,2,3,4,6,7,8-HpCDF	6	6	100%	5.48E-02	5.08E+00	1.78E+00
1,2,3,4,7,8,9-HpCDF	6	6	100%	6.00E-03	3.20E-01	1.17E-01
1,2,3,4,7,8-HxCDD	6	5	83%	2.40E-03	6.88E-02	2.17E-02
1,2,3,4,7,8-HxCDF	6	6	100%	5.05E-03	1.62E-01	5.92E-02
1,2,3,6,7,8-HxCDD	6	6	100%	7.95E-03	3.20E-01	1.10E-01
1,2,3,6,7,8-HxCDF	6	6	100%	2.95E-03	7.19E-02	2.57E-02
1,2,3,7,8,9-HxCDD	6	6	100%	9.75E-03	2.21E-01	6.98E-02
1,2,3,7,8,9-HxCDF	6	6	100%	7.40E-04	2.23E-02	8.21E-03
1,2,3,7,8-PeC00	6	6	100%	2.10E-03	3.89E-02	1.41E-02
1,2,3,7,8-PeCDF	6	4	67%	1.50E-03	1.24E-02	7.66E-03
2,3,4,6,7,8-HxCDF	6	6	100%	3.50E-03	8.99E-02	3.41E-02
2,3,4,7,8-PeCDF	6	6	100%	2.90E-03	3.33E-02	1.28E-02
2.3.7.8-TCDD	6	6	100%	9.00E-04	1.60E-02	7.58E-03
2,3,7,8-TCDF	6	6	100%	6.20E-03	4.48E-02	1.95E-02
Total HpCDD	6	6	100%	5.41E-01	1.79E+01	6.11E+00
Total HpCDF	6	5	83%	1.83E-01	2.17E+01	7.50E+00
Total HxCDD	6	1	17%	1.37E+00	1.37E+00	5.92E-01
Total HxCDF	6	J	0%	ĺ	ſ	5.28E-01
Total PeCDD	6		0%			1.42E-01
Total PeCDF	6		0%			1.20E-01
Total TCDD	6		0%		ļ	1.16E-01
Total TCDF	6		0%			1.79E-01

### Note:

# Sediment Summary Statistics for Dead Creek Sector F Sauget Area I

	Τ	Γ				<u> </u>
]	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/kg	7	20.00.00	2010011011	Dotootoa	20100104	0011001111111111
2,4,5-T	3		0%			63
2,4,5-TP (Silvex)	3	1	0%			63
2,4-D	3	1	33%	23	23	66
2,4-DB	3	1	0%			63
Dalapon	3		0%			517
Dicamba	i 3 i		0%			151
Dichloroprop	ີ <b>່ 3</b>		0%	'		762
Dinoseb	3		0%	·		762
MCPA	3		0%			15067
MCPP	i 3 i		0%			15067
Pentachlorophenol	1 3		0%			104
Metals, mg/kg						
Aluminum	3	3	100%	7800	17000	12933
Antimony	2	2	100%	2.5	2.6	2.55
Arsenic	3	3	100%	8	19	14
Barium	3	3	100%	150	270	223
Beryllium	3	3	100%	0.53	0.89	0.76
Cadmium	3	3	100%	7.4	47	23
Calcium	3	3	100%	11000	13000	11667
Chromium	3	3	100%	19	38	29
Cobalt	3	3	100%	5.5	13	9.83
Copper	3	3	100%	160	410	270
Cyanide, Total	3	J	0%		7.0	0.95
Iron	3	3	100%	14000	26000	20667
Lead	] 3	3	100%	110	320	180
Magnesium	3 3	3	100%	4100	6800	5400
Manganese	3	3	100%	170	510	303
Mercury	3	3	100%	0.3	1.1	0.62
Molybdenum	3	3	100%	0.5	3.7	1.72
Nickel	3	3	100%	90	3.7 390	220
Potassium	3	3	100%	1600	2900	2400
Selenium	3	3	0%	1000	2900	1.80
Silver	3	1	0%	}		1.80
Sodium	3	ļ	0%) 0%)		ļ	132
Thallium	3		0% 0%		i	1.80
Vanadium	3	ا و	100%	25	51	39
Zinc	3	3	100%	25 950	3700	2083
	3	3 3				
pH			100%	6.71	6.87	6.81
Total Organic Carbon	3	3 ]	100%	40000	140000	80333
DOB walks						
PCB, ug/kg	. ا	j	ارمم			70
Decachlorobiphenyl	3	ļ	0%		ĺ	73
Dichlorobiphenyl	3	j	0%		i	14
Heptachlorobiphenyl	3	_ 1	0%	,_[	[	43
Hexachlorobiphenyl	3	2	67%	17	22	33
Monochlorobiphenyl	3	1	0%	ĺ	ĺ	14
Nonachlorobiphenyl	3	İ	0%		1	73
Octachlorobiphenyl	3	ſ	0%	[	ĺ	43
Pentachlorobiphenyl	3	2	67%	61	66	62
Tetrachlorobiphenyl	3	[	0%	ſ	ſ	29
Trichlorobiphenyl	3	ì	0%	ł	ł	14
	{	í			ĺ	
Total PCBs	3	2	67%	83	120	75
Pesticides, ug/kg						
4,4'-DDD	3	1 (	33%	3.8	3.8	11
4,4'-DDE	3	3	100%	2.5	11	7.20
4,4'-DDT	3	1	33%	4.5	4.5	11
Total DDT	3	3	100%	19	43	30
Aldrin	3	1	33%	4.1	4.1	6.37
Alpha Chlordane	3	3	100%	_0.84	5.3	3.58

# Sediment Summary Statistics for Dead Creek Sector F Sauget Area I

	<del></del>	<del></del>	1	_		<del></del>
Company	Number	Number	Frequency of			Average
Compounds alpha-BHC	Analyzed	Detected	Detection 0%	Detected	Detected	Concentration
beta-BHC	3		0%			1.88
delta-BHC	3			0.24	0.04	1.88
	3	1	33%	0.34	0.34	1.61
Dieldrin	3	2	67%	0.99	9.3	9.26
Endosulfan I Endosulfan II	3	3	100%	1.2	5.7	2.97
Endosulfan sulfate	3	3	100%	1.8	8.1	5.13
Endrin	3	1	33% 67%	2.8 1.7	2.8	11
	3	2			1.7	6.97
Endrin aldehyde	3	3	100%	3.6	14	8.87
Endrin ketone Gamma Chlordane	3	3	100%	3.8	10	7.00
gamma-BHC (Lindane)	3	3	100%	2.4	17	8.97
	3	_	0%	0.00	0.00	6.30
Heptachlor	3	1	33%	0.93	0.93	4.61
Heptachior epoxide	3	2	67%	0.51	5.4	4.97
Methoxychlor	3	3	100%	7.3	24	15
Toxaphene	3		0%			630
SVOCs, ug/kg	_					
1,2,4-Trichlorobenzene	3		0%		i	318
1,2-Dichlorobenzene	3		0%			318
1,3-Dichlorobenzene	3		0%			318
1,4-Dichlorobenzene	3		0%			318
2,2'-Oxytois(1-Chloropropane)	3		0%			318
2,4,5-Trichlorophenol	3		0%			318
2,4,6-Trichlorophenol	3		0%			318
2,4-Dichlorophenol	3		0%			318
2,4-Dinitrophenol	3		0%			1600
2,4-Dinitrotoluene	3		0%			318
2,6-Dinitrololuene	3		0%			318
2-Chloronaphthalene	3		0%			318
2-Chlorophenol	3		0%			318
2-Methylnaphthalene	3		0%	ĺ		318
2-Methylphenol (o-cresol)	3		0%	i		318
2-Nitroaniline	3		0%			1600
2-Nitrophenol	3		0%			318
3,3'-Dichlorobenzidine	3	ľ	0%	ł		612
3-Methylphenol/4-Methylphenol	3		0%			318
3-Nitroaniline	3		0%	•		1600
4,6-Dinitro-2-methylphenol	3		0%			1600
4-Bromophenylphenyl ether	3	ł	0%	ł	ł	318
4-Chloro-3-methylphenol	3		0%	1		318
4-Chloroaniline	3		0%			612
4-Chlorophenylphenyl ether	3		0%			318
4-Nitroaniline	3	J	0%	j	ļ	1600
4-Nitrophenol	3		0%			1600
Acenaphthene	3		0%			318
Acenaphthylene	3		0%			318
Anthracene	3		0%			318
Benzo(a)anthracene	3	1	0%		ľ	318
Benzo(a)pyrene	3	ľ	0%		1	168
Benzo(b)fluoranthene	3		0%		ļ	318
Benzo(g,h,i)perylene	3	ļ	0%			318
Benzo(k)fluoranthene	3	i	0%		}	318
bis(2-Chloroethoxy)methane	3		0%			318
bis(2-Chloroethyl)ether	3		0%			318
bis(2-Ethylhexyl)phthalate	3		0%			
Butylbenzylphthalate	3	ļ	0%	1	ļ	318
Carbazole	3	Į	0%	- 1		318
		اہ		ا ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ		318
Chrysene Di a bradabithata	3	1	33%	74	74	276
Di-n-butylphthalate	3		0%			318
Di-n-octylphthalate	3	[	0%	[	ſ	318
Dibenzo(a,h)anthracene	3		0%			168

# Sediment Summary Statistics for Dead Creek Sector F Sauget Area I

	<del></del>	<del></del>	<del></del>		<del></del>	<del> </del>
]			]			
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dibenzofuran	3	Detected	0%	Detected	Detected	318
Diethylphthalate	3	}	0%			318
Dimethylphthalate	3		0%			318
Fluoranthene	3	2	67%	120	130	
Fluorene	3	_	0%	120	130	
Hexachlorobenzene						318
	3		0%			132
Hexachlorobutadiene	3		0%			318
Hexachlorocyclopentadiene	3		0%			318
Hexachloroethane	3	•	0%			318
Indeno(1,2,3-cd)pyrene	3		0%			318
Isophorone	3		0%			318
N-Nitroso-di-n-propylamine	] 3		0%			318
N-Nitrosodiphenylamine	] 3		0%			318
Naphthalene	] 3	1	0%			318
Nitrobenzene	] 3		0%			318
Pentachlorophenol	] 3		0%			1600
Phenanthrene	] 3		0%	[		318
Phenol	] 3		0%			318
Pyrene	3		0%		i ,	318
	1					
Total PAHs	1 3	2	67%	194	440	360
VOCs, ug/kg	<del> </del>					
1,1,1-Trichloroethane	3		0%			14
1,1,2,2-Tetrachloroethane	3		0%			14
1,1,2-Trichloroethane	j š		0%		ŀ	14
1,1-Dichloroethane	3		0%			14
1,1-Dichloroethene	3		0%	1	ł	13
1,2-Dichloroethane	3		0%	ł		14
1,2-Dichloropropane	3		0%		i	14
2-Butanone (MEK)	3		0%		1	69
2-Hexanone	3		0%			69
4-Methyl-2-pentanone (MIBK)				- (	ſ	
	3		0%			69
Acetone	] 3		0%		ļ	145
Benzene	3		0%			14(
Bromodichloromethane	3		0%			14
Bromoform	3		0%	1	1	14
Bromomethane (Methyl bromide)	3	l	0%		ļ	28
Carbon disulfide	3	1	0%	ļ	J	14
Carbon tetrachloride	3		0%	ŀ	ì	14
Chlorobenzene	3	j	0%	ļ		14
Chioroethane	3	ļ	0%	l		28
Chloroform	3		0%			14
Chloromethane	3	}	0%	ł	}	28
cis-1,3-Dichloropropene	3		0%	[	ſ	11
Cis/Trans-1,2-Dichloroethene	3	J	0%	ļ	J	14
Dibromochloromethane	3	ł	0%	ł		14
Ethylbenzene	3	1	33%	11	11	13
Methylene chloride (Dichloromethane)	3	1	0%)	- 1	]	14
Styrene	3	ĺ	0%	Ī	i	14
Tetrachloroethene	3		0%			14
Toluene	3	}	0%	1	ļ	14
trans-1,3-Dichloropropene	3	ļ	0%	1		11
Trichloroethene	3		0%	ļ		
Vinyl chloride	3		0%	ſ		14)
Xylenes, Total	3	ļ	0%	1		28
Aylenes, rotal	31		U%]			14

### Note:

# Sediment Dioxin Data Summary for Dead Creek Sector F Sauget Area I

			<u> </u>			
	Number	Number	Frequency of		Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Dioxins and Furans, ug/kg						
1,2,3,4,6,7,8,9-OCDD	3	3	100%	3.87E+01	8.84E+01	5.82E+01
1,2,3,4,6,7,8,9-OCDF	3	3	100%			2.23E+01
1,2,3,4,6,7,8-HpCDD	3	3	100%			_
1,2,3,4,6,7,8-HpCDF	3	3	100%			
1,2,3,4,7,8,9-HpCDF	3	3	100%	1.57E-01	3.20E-01	2.25E-01
1,2,3,4,7,8-HxCDD	3	3	100%	2.28E-02	6.88E-02	4.02E-02
1,2,3,4,7,8-HxCDF	3 3	3	100%	8.42E-02	1.62E-01	1.11E-01
1,2,3,6,7,8-HxCDD	3	3	100%	1.41E-01	3.20E-01	2.07E-01
1,2,3,6,7,8-HxCDF	3	3	100%	3.25E-02	7.19E-02	4.70E-02
1,2,3,7,8,9-HxCDD	3	3	100%	6.67E-02	2.21E-01	1.26E-01
1,2,3,7,8,9-HxCDF	3	3	100%	8.50E-03	2.23E-02	1.39E-02
1,2,3,7,8-PeCDD	3	3	100%	1.45E-02	3.89E-02	2.55E-02
1,2,3,7,8-PeCDF	3	2	67%	1.18E-02	1.24E-02	1.36E-02
2,3,4,6,7,8-HxCDF	3	3	100%	4.73E-02	8.99E-02	6.25E-02
2,3,4,7,8-PeCDF	3	3	100%	1.47E-02		2.20E-02
2,3,7,8-TCDD	3	3	100%			9.93E-03
2,3,7,8-TCDF	3	3	100%	1.60E-02	4.48E-02	3.04E-02
Total HpCDD	3	3	100%	7.86E+00	1.79E+01	1.14E+01
Total HpCDF	3	3	100%	1.07E+01	2.17E+01	1.46E+01
Total HxCDD	3	1	33%	1.37E+00	1.37E+00	1.11E+00
Total HxCDF	3	l	0%			1.01E+00
Total PeCDD	3		0%			2.60E-01
Total PeCDF	3		0%			2.21E-01
Total TCDD	3 :		0%			2.08E-01
Total TCDF	3		0%			3.17E-01

#### Note:

# Sediment Data Summary for Borrow Pit Lake Sauget Area I

	7	····			Ι	
	Number	Number	Frequency Of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/kg	1 .				İ	
2,4,5-T	3		0%			12
2,4,5-TP (Silvex)	3		0%		١	12
2,4-D	3	2	67%	8.8	11	11
2,4-DB	3		0%			12
Dalapon Dicamba	3 3		0% 0%		·	92 28
Dichloroprop	3		0%			142
Dinoseb	3	i .	0%			142
MCPA	3		0%	1		2,817
MCPP	3		0%			2,817
Pentachlorophenol	3		0%			2,017
Metals, mg/kg	<del>                                     </del>				<b></b>	<u></u>
Aluminum	3	3	100%	11,000	16,000	13,667
Antimony	3	2	67%	1.5	2.2	2.2
Arsenic	1 3	3	100%	13	17	16
Barium	] 3	3	100%	240	420.00	350
Beryllium	] 3	3 3	100%	0.58	0.82	0.71
Cadmium	3	3	100%	1.6	2.7	2.1
Calcium	] 3	3	100%	11,000	17,000	14,667
Chromium	3	3	100%	18	26	22
Cobalt	] 3 [	3	100%	7.1	10	8.9
Copper	] 3	3	100%	36	64	49
Cyanide, Total	3		0%			0.72
Iron	3	3 3	100%	28,000	38,000	34,000
Lead	3	3	100%	34	58	48
Magnesium	3 3	3	100% 100%	3,600 940	5,600	4,667
Manganese Mercury	3	3 3	100%	0.10	1,400 0.16	1,213
Molybdenum	3	3	100%	0.10	0.18	0.12 0.60
Nickel	3	3	100%	35	0.92 54	47
Potassium	3	3	100%	1,500	2,200	1,967
Selenium	3	۱ ۲	0%	1,300	2,200	1,907
Silver	3	1	33%	0.79	0.79	1.1
Sodium	3	•	0%	0.70	0.70	93
Thallium	3		0%			1.4
Vanadium	3 (	3	100%	28	40	35
Zinc	3	3	100%	250	370	310
pH	3	3	100%	6.7	7.1	6.9
Total Organic Carbon (mg/kg dry weight)	3	3	100%	33,000	67,000	48,333
PCB, ug/kg						· · ·
Decachlorobiphenyl	3		0%			39
Dichlorobiphenyl	3		0%			7.8
Heptachlorobiphenyl	3	<b>[</b>	0%	1	l	24
Hexachlorobiphenyl	3	i	0%	ł		16
Monochlorobiphenyl	3		0%		ł	7.8
Nonachlorobiphenyl	3		0%			39
Octachlorobiphenyl	3 3	1	0%	ſ	ļ	24
Pentachlorobiphenyl	3		0%[	1		16
Tetrachlorobiphenyl	3		0%			16
Trichlorobiphenyl	3	i	0%	i	ŀ	7.8
Total PCBs	3		0%			39
Pesticides, ug/kg	_		20.			
4,4'-DDD	3	ا ؞	0%			8.5
1,4'-DDE	3	3	100%	1.1	3.2	2.0
1,4'-DDT	3	2	67%	1.1	1.4	4.0
Total DDT	3	3	100%	2.2	12.7	6.0
Aldrin	3	_	0%			4.4
Alpha Chlordane	3	3	100%	0.48	3.2	1.6
alpha-BHC	3	ŀ	0%		ļ	1.3
peta-BHC	3		0%		1	1.3

### Sediment Data Summary for Borrow Pit Lake Sauget Area I

Deliction			T	T			<u></u>
Detected   Detected   Detected   Detected   Concentration		Number	Mumber	Fraguescy Of	Minimum	Mayimum	Averson
Seles-BHC   3	Compounds					***************************************	
Deliction			-				1.3
Endosulan I	Dieldini		2		0.26	0.50	3.3
Endosulan II	Endosultan I						2.9
Excitation					1.00		8.5
Entime   3   0%   1.2   2.2   1.1   Entime latehyde   3   3   10%   1.2   2.2   1.1   Entime latehyde   3   3   1   33%   0.72   0.72   Entime latehyde   3   1   33%   0.72   0.72   Entime latehyde   3   1   33%   4.8   4.8   Entime latehyde   3   1   33%   4.8   4.8   Espachfor   3   0%   4.8   Espachfor   3   0%   Espach			,		1.4	9.5	6.6
Entima Internation   3   100%   1.2   2.2   1. Entima Internation   3   1   33%   0.72   0.72   5.5			} -			J.5	8.5
Entrain teacher   3			3		12	22	1.6
Samma Bir Chlordane			_				·
parmis BHC (Lindone)   3   1   33%   4.8							
Explacation   3   0%   4.8   4.8   4.8					-		
Improvided   3			·		4.0	4.0	_
Methosychlor					AQ	40	
Grouphere   3   0%   444			'		4.0	4.0	
SVCEs, ughts   2.4 Trichtoroberozene   3   0%   24   2.2   2.4 Trichtoroberozene   3   0%   24   24   2.2   2.4 Trichtoroberozene   3   0%   24   24   24   25   25   25   25   25							
2.4-Trichioroberizane   3   0%   244							440
2-Dichlorobenzene   3   0%   244		—					040
3-Dichlorobenzene   3   0%   244							
A-Dictivoroprene    3		<del></del> -1					
22-Orytos(1-Chloropropane)   3							
24.4.5-Trichtorophenol   3							240
24-Dichlorophenol   3							240
24-Dintrophenol   3		i					240
4-Dintrotoluene   3							240
A-Dintrotolulene   3							240
Se Dinitrotoluene   3							-
Chlorophenol   3	2,4-Dinitrotoluene				i		240
Chlorophenol   3	2,6-Dinitrotoluene						240
Allethylphenol (o-cresol)	2-Chloronaphthalene						240
Aleitryphenol (o-cresol)   3   0%   1,200	2-Chlorophenol	3				1	240
Altrophenol   3   3   3   3   3   3   3   3   3	2-Methylnaphthalene	3					240
Altrophenol   3	2-Methylphenol (o-cresol)	3					240
3-Dichlorobertzidine   3   0%   244	2-Nitroaniline	3		0%			1,200
Alterhylphenol/4-Methylphenol   3   0%   1,200   1,2	2-Nitrophenol	3					240
Attribution   Actio		3		0%			463
Attribution   Actio	3-Methylphenol/4-Methylphenol	3		0%			240
5-Dinitro-2-methylphenol   3   0%   244	3-Nitroaniline			0%			1,200
Bromophenylphenyl ether   3   0%   244    -Chlorop-3-methylphenol   3   0%   245    -Chlorophenylphenyl ether   3   0%   245    -Nitrophenol   3   0%   1,200    -Nitrophenol   3   0%   1,200    -Nitrophenol   3   0%   245    -Nitrophenol   3   0%	4,6-Dinitro-2-methylphenol			0%	ł		1,200
Chloro-3-methylphenol   3				0%			240
Chlorophenylphenyl ether   3   0%   244    -Nitrophenyl ether   3   0%   1,200    -Nitrophenyl ether   3   0%   1,200    -Nitrophenol   3   0%   1,200		<sub>3</sub>		0%			240
Chlorophenylphenyl ether   3	1-Chloroaniline				1		463
Nitrophenol   3		_ 3			j	J	240
Altrophenol   3	l-Nitroaniine						
ceraphthene         3         0%         24(           ceraphthylene         3         0%         24(           enzo(a)anthracene         3         0%         24(           enzo(a)pyrene         3         0%         127           enzo(b)fluoranthene         3         0%         24(           enzo(b, h)perylene         3         0%         24(           enzo(k, fluoranthene         3         0%         24(           enzo(k, fluoranthene         3         0%         24(           s(2-Chloroethoxy)methane         3         0%         24(           s(2-Chloroethyl)ether         3         0%         24(           s(2-Chloroethyl)phthalate         3         0%         24(           arbazole         3         0%         24(           arbazole         3         0%         24(           i-n-butylphthalate         3         0%         24(           i-n-octylphthalate         3         0%         24(           ibenzoluanthracene         3         0%         24(           ibenzoluran         3         0%         24(		_ 3					
ceraphthylene         3         0%         240           enzo(a)anthracene         3         0%         240           enzo(a)pyrene         3         0%         240           enzo(b)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%         240           enzo(k)fluoranthene         3         0%	Acenaphthene				1		
240		<del></del> .					
enzo(a)anthracene 3 0% 127 127 128 129 129 129 129 129 129 129 129 129 129		_	ľ		ľ	1	
enzo(a)pyrene   3							
enzo(b)   fluorarithene   3							
enzo(g,h,i)perylene         3         0%         24(           enzo(k)fluoranthene         3         0%         24(           s(2-Chloroethoxy)methane         3         0%         24(           s(2-Chloroethyl)ether         3         0%         24(           s(2-Ethylhexyl)phthalate         3         0%         24(           utylbenzyliphthalate         3         0%         24(           arbazole         3         0%         24(           hrysene         3         0%         24(           i-n-butylphthalate         3         0%         24(           i-n-octylphthalate         3         0%         24(           ibenzo(a,h)anthracene         3         0%         24(           ibenzofuran         3         0%         24(							
enzo(k)fluoranthene         3         0%         24(           is(2-Chloroethoxy)methane         3         0%         24(           is(2-Chloroethyl)ether         3         0%         24(           s(2-Ethylhexyl)phthalate         3         0%         24(           utylbenzyliphthalate         3         0%         24(           arbazole         3         0%         24(           hrysene         3         0%         24(           i-n-butylphthalate         3         0%         24(           i-n-octylphthalate         3         0%         24(           ibenzo(a,h)anthracene         3         0%         24(           ibenzofuran         3         0%         24(			}			1	
s(2-Chloroethoxy)methane       3       0%       24(         s(2-Chloroethyl)ether       3       0%       24(         s(2-Ethylhexyl)phthalate       3       0%       24(         utylbenzylphthalate       3       0%       24(         arbazole       3       0%       24(         hrysene       3       0%       24(         i-n-butylphthalate       3       0%       24(         i-n-octylphthalate       3       0%       24(         ibenzo(a,h)anthracene       3       0%       127         ibenzofuran       3       0%       24(	Serizo(g)Tujperyione						
s(2-Chloroethyl)ether       3       0%       24(         s(2-Ethylhexyl)phthalate       3       0%       24(         utylbenzylphthalate       3       0%       24(         arbazole       3       0%       24(         hrysene       3       0%       24(         i-n-butylphthalate       3       0%       24(         i-n-octylphthalate       3       0%       24(         ibenzo(a,h)anthracene       3       0%       127         ibenzofuran       3       0%       24(		<b>_</b>					
s(2-Ethylhexyl)phthalate       3       0%       24(         utylbenzylphthalate       3       0%       24(         arbazole       3       0%       24(         hrysene       3       0%       24(         i-n-butylphthalate       3       0%       24(         i-n-octylphthalate       3       0%       24(         ibenzo(a,h)anthracene       3       0%       127         ibenzofuran       3       0%       24(		<del>_</del>	}		ļ	ļ	240
utyfbenzylphthalate     3     0%     24(       arbazole     3     0%     24(       hrysene     3     0%     24(       i-n-butylphthalate     3     0%     24(       i-n-octylphthalate     3     0%     24(       ibenzo(a,h)anthracene     3     0%     127       ibenzofuran     3     0%     24(	AS(2-CHOROEUTY) Jeuner				l	]	240
arbazole     3     0%     240       hrysene     3     0%     240       i-n-butylphthalate     3     0%     240       i-n-octylphthalate     3     0%     240       ibenzo(a,h)anthracene     3     0%     127       ibenzofuran     3     0%     240		_	ĺ		[	ſ	240
hrysene 3 0% 24( i-n-butylphthalate 3 0% 24( i-n-octylphthalate 3 0% 24( ibenzo(a,h)anthracene 3 0% 127 ibenzofuran 3 0% 24(							240
-n-butylphthalate 3 0% 24( -n-octylphthalate 3 0% 24( ibenzo(a,h)anthracene 3 0% 127 ibenzofuran 3 0% 24(							240
-n-octylphthalate 3 0% 24( ibenzo(a,h)anthracene 3 0% 127 ibenzofuran 3 0% 24(							240
ibenzo(a,h)anthracene         3         0%         127           benzofuran         3         0%         240	Di-n-butylphthalate		ł		l	ł	240
ibenzofuran 3 0% 240					l		240
ibenzofuran 3 0% 240	Dibenzo(a,h)anthracene				l		127
ethylphthalate 3 0% 240	Dibenzofuran				l		240
	Diethylphthalate	3	J	0%	J	J	240

# Sediment Data Summary for Borrow Pit Lake Sauget Area I

	Τ					<u> </u>
1	Number	N	F	Minimo		•
Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dimethylphthalate	3		0%			240
Fluoranthene	3		0%		1	240
Fluorene	3		0%			240
Hexachlorobenzene	3		0%		]	97
Hexachlorobutadiene	3		0%			240
Hexachlorocyclopentadiene	3	İ	0%			240
Hexachloroethane	3		0%			240
Indeno(1,2,3-cd)pyrene	3		0%			240
Isophorone	3		0%			240
N-Nitroso-di-n-propylamine	3		0%			240
N-Nitrosodiphenylamine	3		0%			240
Naphthalene	3		0%			240
Nitrobenzene	3		0%			
Pentachlorophenol	3		0%			240 1,200
Phenanthrene	3		0%			240
Phenol	3	İ	0%			240
Pyrene	3		0%			240
Total PAHs	3		0%			240
VOCs, ug/kg	1 .1					
1,1,1-Trichloroethane	] 3		0%			13
1,1,2,2-Tetrachloroethane	3		0%			13
1,1,2-Trichloroethane	3		0%			13
1,1-Dichloroethane	] 3		0%			13
1,1-Dichloroethene	] 3		0%			12
1,2-Dichloroethane	3		0%			13
1,2-Dichloropropane	] 3		0%			13
2-Butanone (MEK)	3		0%			65
2-Hexanone	3		0%			65
4-Methyl-2-pentanone (MIBK)	3 [		0%			65
Acetone	] 3 ]		0%			130
Benzene	3		0%			13
Bromodichloromethane	3		0%	'		13
Bromoform	3		0%			13
Bromomethane (Methyl bromide)	3	J	0%			26
Carbon disulfide	3		0%			13
Carbon tetrachloride	3	j	0%			13
Chlorobenzene	3		0%			13
Chloroethane	3	j	0%			26
Chloroform	3	i	0%			13
Chloromethane	3	j	0%			26
cis-1,3-Dichloropropene	3		0%			10
Cis/Trans-1,2-Dichloroethene	3	Į.	0%			
Dibromochloromethane		]	0%			13
	3	1	0%			13
Ethylbenzene	3		0%			13
Methylene chloride (Dichloromethane)	3		0%  0%			13
Styrene	3	ļ				13
Tetrachloroethene	3	ł	0%			13
Toluene	3	ſ	0%			13
trans-1,3-Dichloropropene	3	}	0%			10
Trichloroethene	3		0%			13
Vinyl chloride	3	}	0%			26
Xylenes, Total	3		0%			13

# Note:

# Sediment Dioxin Summary for Borrow Pit Lake Sauget Area I

	· · ·		I			
Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dioxins and Furans, ug/kg				-		
1,2,3,4,6,7,8,9-OCDD	3	3	100%	8.63	17.25	13.79
1,2,3,4,6,7,8,9-OCDF	] 3	3	100%	0.24	0.76	0.55
1,2,3,4,6,7,8-HpCDD	3	3	100%	0.24	0.44	0.37
1,2,3,4,6,7,8-HpCDF	] 3	3	100%	0.05	0.16	0.11
1,2,3,4,7,8,9-HpCDF	3	3	100%	0.01	0.01	0.01
1,2,3,4,7,8-HxCDD	3	2	67%	0.0024	0.0049	0.0031
1,2,3,4,7,8-HxCDF	3	3	100%	0.01	0.0092	0.01
1,2,3,6,7,8-HxCDD	3	3	100%	0.01	0.02	0.01
1,2,3,6,7,8-HxCDF	3	3	100%	0.0030	0.0059	0.0043
1,2,3,7,8,9-HxCDD	3	3	100%	0.01	0.02	0.01
1,2,3,7,8,9-HxCDF	3	3	100%	0.00074	0.0036	0.0025
1,2,3,7,8-PeCDD	3	3	100%	0.0021	0.0035	0.0026
1,2,3,7,8-PeCDF	3	2	67%	0.0015	0.0027	0.0017
2,3,4,6,7,8-HxCDF	3	3	100%	0.0035	0.0073	0.01
2.3.4,7,8-PeCDF	3	3	100%	0.0029	0.0042	0.0037
2,3,7,8-TCDD	3	3	100%	0.00090	0.01	0.01
2,3,7,8-TCDF	3	3	100%	0.01	0.01	0.01
Total HpCDD	3	3	100%	0.54	0.93	0.80
Total HpCDF	3	2	67%	0.18	0.60	0.35
Total HxCDD	3		0%			0.07
Total HxCDF	3		0%			0.05
Total PeCDD	3		0%			0.02
Total PeCDF	3		0%			0.02
Total TCDD	3		0%			0.02
Total TCDF	3		0%			0.04

#### Note:

# Reference Area Sediment Summary Statistics Sauget Area I

	1					
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Herbicides, ug/kg	7 4121/200	20100100		200000	20130103	- CONTOUNTED TO
2,4,5-T	4		0%			9.00
2,4,5-TP (Silvex)	1 4		0%			9.00
2,4-D	1 4	1	25%	12	12	10
2,4-DB	4		0%	'-		9.00
Dalapon	4		0%			69
Dicamba	[ 4]		0%			22
Dichloroprop	4		0%			110
Dinoseb	4		0%			110
MCPA	4		0%		-	2175
MCPP	1 4		0%			2175
Pentachlorophenol	4	1	25%	1.9	1.9	15
Metals, mg/kg	<del> </del>		2376	1.5	1,5	<u></u>
Aluminum	ا ہا		100%	12000	19000	14500
Antimony	4	4	75%			
	4	3		1.3	4	2.10
Arsenic	4	4	100%	6.7	8	7.18
Barium	4	4	100%	170	230	208
Beryllium	4 [	4	100%	0.62	1	0.78
Cadmium	4	4	100%	0.29	0.65	0.42
Calcium	4	4	100%	12000	18000	13500
Chromium	4	4	100%	17	25	20
Cobalt	4 ]	4	100%	7.1	10	8.60
Copper	4	4	100%	16	23	19
Cyanide, Total	4		0%			0.55
ron	4	4	100%	18000	24000	20750
ead	4	4	100%	17	26	22
Magnesium	4	4	100%	3300	6500	5150
Manganese	4	4	100%	570	770	708
Mercury	4 أ	4	100%	0.04	0.063	0.05
Molybdenum	4	4	100%	0.37	0.53	0.45
Vickel	41	4	100%	18	26	22
Potassium	41	4	100%	1600	2600	2100
Selenium	4	•	0%			1.03
Silver	4	j	0%			1.03
Sodium	4	i	0%	ì		85
hallium	4		0%			1.03
/anadium	41	4	100%	30	44	35
inc	4	4	100%	59	96	83
H	. 1		100%	6.8	7.31	7.07
	4	4	100%	12000		17000
otal Organic Carbon	4	4	100%	12000	23000	17000
DOD						<del></del>
PCB, ug/kg	_ [		0%	1	ľ	40
Decachlorobiphenyl	4					18
Dichlorobiphenyl	4	ſ	0%	i		3.60
leptachlorobiphenyl	4	ł	0%	ł		11
lexachlorobiphenyl	4	}	0%			7.25
fonochlorobiphenyl	4	i	0%	i		3.60
lonachlorobiphenyl	4 ]		0%			18.3
Octachlorobiphenyl	4	ĺ	0%	1		11
Pentachlorobiphenyl	4		0%			7.25
etrachlorobiphenyl	4	ł	0%			7.25
richlorobiphenyl	4	1	0%	1		3.60
		ļ				
otal PCBs	4		0%	[		18.3
esticides, ug/kg				ı		
,4'-DDD	4		0%			3.58
,4'-DDE	4 [	ſ	0%	Ş	j	3.58
	4 1		0%		ļ	3.58
,4'-DDT			1			
	4	ļ	0%[		l l	1.85
,4'-DDT Ildrin						
,4'-DDT	4		0%  0%  0%			1.85 1.85 0.54

# Reference Area Sediment Summary Statistics Sauget Area I

	1					
]	86	<b>A</b> f6				
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
delta-BHC	4	Detected	0%	Detected	Detected	0.54
Dieldon	4		0%			3.58
Endosulfan I	4		0%			1.85
Endosulfan II	4		0%			3.58
Endosulfan sulfate	4		0%		1	3.58
Endrin	4		0%			3.58
Endrin aldehyde	4		0%			3.58
Endrin ketone	] 4]		0%			3.58
Gamma Chlordane	4		0%			1.85
gamma-BHC (Lindane)	4		0%			1.85
Heptachlor	] 4		0%			1.85
Heptachlor epoxide	] 4		0%			1.85
Methoxychlor	4		0%			19
Toxaphene	4		0%			185
SVOCs, ug/kg					·	
1,2,4-Trichloroberizene	4		0%			184
1,2-Dichlorobenzene	4		0%			184
1,3-Dichlorobenzene	4		0%			184
1,4-Dichlorobenzene	4		0%			184
2.2'-Oxybis(1-Chloropropane)	4		0%			184
2,4,5-Trichlorophenol	4		0%			184
2,4,6-Trichlorophenol	4		0%			184
2.4-Dichlorophenol	4		0%			184
2.4-Dinitrophenol	4		0%			925
2.4-Dinitrotoluene	•		0%			184
2.6-Dinitrotoluene	•		0% 0%			184
2-Chloronaphthalene	7		0%			184
2-Chlorophenol 2-Methylnaphthalene			0%			184 184
2-Methylphenol (o-cresol)	] ]		0%			184
2-Nitroaniline	7		0% 0%			925
2-Nitrophenol	' 7		0%			184
3,3'-Dichlorobenzidine	7		0%			359
3-Methylphenol/4-Methylphenol	4		0%			184
3-Nitroaniline	4		0%			925
4,6-Dinitro-2-methylphenol	4		0%			925
4-Bromophenylphenyl ether	4		0%			184
4-Chloro-3-methylphenol	4		0%			184
4-Chloroaniine	4		0%			359
4-Chlorophenylphenyl ether	4	l	0%	İ		184
4-Nitroaniline	4		0%			925
4-Nitrophenol	4		0%			925
Acenaphthene	4 [	ſ	0%[		İ	184
Acenaphthylene	4		0%			184
Anthracene	4		0%			184
Benzo(a)anthracene	4		0%			184
Benzo(a)pyrene	4	j	0%			98
Berizo(b)fluoranthene	4		0%		ļ	184
Benzo(g,h,i)perylene	4		0%		ĺ	184
Benzo(k)fluoranthene	4		0%			184
bis(2-Chloroethoxy)methane	4		0%			184
bis(2-Chloroethyl)ether	4		0%			184
bis(2-Ethylhexyl)phthalate	4	ļ	0%		'	184
Butylbenzylphthalate	4		0%			184
Carbazole	4		0%			184
Chrysene	4		0%			184
Di-n-butytohthalate	4	1	0%			184
Di-n-octylphthalate	4		0%			184
Dibenzo(a,h)anthracene	4		0%			98
Dibenzofuran	4		0%			184
Diethylphthalate	4		0%			184

#### Reference Area Sediment Summary Statistics Sauget Area I

	<u> </u>	J	J			<u> </u>
[	M	Non-the-		8811	<b>M</b>	<b>A</b>
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dimethylphthalate	Allaly2ed 4	Detected	0%	Detected	Detected	184
Fluoranthene	4	1	0%			184
Fluorene	1 4		0%			184
Hexachlorobenzene	[ 7]		0%			
· · · · · · · · · · · · · · · · · · ·	1 71					75
Hexachlorobutadiene	4		0%			184
Hexachlorocyclopentadiene	4		0%			184
Hexachloroethane	4		0%			184
Indeno(1,2,3-cd)pyrene	4		0%			184
Isophorone	4		0%	i i		184
N-Nitroso-di-n-propylamine	4		0%			184
N-Nitrosodiphenylamine	4		0%			184
Naphthalene	4		0%			184
Nitrobenzene	4		0%			184
Pentachiorophenol	4		0%			925
Phenanthrene	4		0%			184
Phenol	1 4		0%			184
Pyrene	[ 4 [		0%			184
Total PAHs	4		0%			
VOCs, ug/kg			076		L	98
1,1,1-Trichloroethane	ا ا		0%			6.50
1,1,1-Irichioroethane	4					6.56
1,1,2,2-Tetrachloroethane	4		0%			6.56
1,1,2-Trichloroethane	4		0%			6.56
1,1-Dichloroethane	4		0%			6.56
1,1-Dichloroethene	4		0%			5.96
1,2-Dichloroethane	4		0%			6.56
1,2-Dichloropropane	4		0%			6.56
2-Butanone (MEK)	4	3	75%	14	40	25
2-Hexanone	4		0%		i	33
4-Methyl-2-pentanone (MIBK)	4		0%			33
Acetone	4 ]	3	75%	52	160	78
Benzene	4 ]	J	0%	j		6.56
Bromodichloromethane	4	ł	0%	ł		6.56
Bromoform	4		0%			6.56
Bromomethane (Methyl bromide)	4		0%			13
Carbon disulfide	4 [	ſ	0%	ĺ		6.56
Carbon tetrachloride	4		0%			6.56
Chlorobenzene	4	}	0%			6.56
Chloroethane	4	ł	0%	ł		13
Chloroform	4 أ	ĺ	0%	ĺ	1	6.56
Chloromethane	4	j	0%	ļ		13
cis-1,3-Dichloropropene	4		0%	j		5.34
Cis/Trans-1,2-Dichloroethene	4		0%	ŀ		6.56
Dibromochloromethane	4	}	0%	ł		6.56
Ethylbenzene	4		0%	ļ		6.56
Methylene chloride (Dichloromethane)	4	]	0%			6.56
Styrene	4	1	0%	ſ		6.56
Tetrachloroethene	4	İ	0%			6.56
Toluene	4	J	0%	j		6.56
trans-1,3-Dichloropropene	4		0%	l		5.34
Trichloroethene	4	]	0%		, İ	6.56
Vinyl chloride	4	j	0%	ļ		13
Xylenes, Total	4		0%			6.56
9.5.559 1000			<u> </u>			<u> </u>

#### Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

### Reference Area Sediment Dioxin Summary Statistics Sauget Area I

	<u> </u>	·				
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Dioxins and Furans, ug/kg						_
1,2,3,4,6,7,8,9-OCDD	4	4	100%	3.47E+00	8.57E+00	5.24E+00
1,2,3,4,6,7,8,9-OCDF	4	4	100%	1.43E-02	1.36E-01	9.63E-02
1,2,3,4,6,7,8-HpCDD	4	4	100%	1.28E-01	1.62E-01	1.46E-01
1,2,3,4,6,7,8-HpCDF	4	4	100%	5.90E-03	3.07E-02	2.26E-02
1,2,3,4,7,8,9-HpCDF	4	1	25%	3.00E-03	3.00E-03	1.31E-03
1,2,3,4,7,8-HxCDD	4	3	75%	1.10E-03	2.20E-03	1.45E-03
1,2,3,4,7,8-HxCDF	4	2	50%	2.90E-03	3.00E-03	1.85E-03
1,2,3,6,7,8-HxCDD	4	4	100%	3.30E-03	4.60E-03	4.08E-03
1,2,3,6,7,8-HxCDF	4	1	25%	1.30E-03	1.30E-03	6.08E-04
1,2,3,7,8,9-HxCDD	4	4	100%	3.40E-03	5.10E-03	4.40E-03
1,2,3,7,8,9-HxCDF	4		0%			1.09E-04
1,2,3,7,8-PeCDD	4	2	50%	1.30E-03	1.50E-03	1.03E-03
1,2,3,7,8-PeCDF	4	1	25%	1.10E-03	1.10E-03	4.46E-04
2,3,4,6,7,8-HxCDF	4	2	50%	1.60E-03	1.80E-03	1.05E-03
2,3,4,7,8-PeCDF	4	1	25%	1.30E-03	1.30E-03	6.61E-04
2,3,7,8-TCDD	4 ]	2	50%	6.40E-04	3.50E-03	1.16E-03
2,3,7,8-TCDF	4	4	100%	7.60E-04	1.40E-03	1.22E-03
Total HpCDD	4	4	100%	2.78E-01	3.47E-01	3.23E-01
Total HpCDF	4	2	50%	1.64E-02	1.13E-01	5.81E-02
Total HxCDD	4	1	25%	4.58E-02	4.58E-02	2.88E-02
Total HxCDF	4	3	75%	6.20E-03	2.52E-02	1.65E-02
Total PeCDD	4	1	25%	2.10E-02	2.10E-02	1.75E-02
Total PeCDF	4		0%			3.96E-03
Total TCDD	4		0%			1.17E-02
Total TCDF	4	2	50%	6.80E-03	1.45E-02	9.14E-03

#### Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

### Sediment Summary Statistics for Dead Creek Sector F (Combined Shallow (0-2 inch) and Deep "Industry Specific" Samples) Sauget Area I

2,4,5-TP (Silvex)   3	Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
2,4-D         3         1         33%         23         23           2,2-DB         3         0         0%			0	0%			63
2.4 DB			0				63
Dalapon   3			1		23	23	66
Dicamba   3   0   0%	2,4-DB		0				63
Dichloroprop   3							517
Dinoseb   3							151
MCPA MCPP         3 0 0 0 0 0%         0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0							762
MCPP							762
Pentachlorophenol   3							15067
Aluminum	MCPP			0%			15067
Antimony 2 2 2 100% 2.5 2.6 Arsenic 3 3 100% 8 19 Barium 3 3 100% 150 270 Beryllium 3 3 100% 0.53 0.89 Cadmium 3 3 100% 0.53 0.89 Cadmium 3 3 100% 11000 13000 13000 Chromium 3 3 100% 19 38 Cobalt 3 3 100% 150 5.5 13 Copper 19 19 100% 26 5400 Cyanide, Total 3 0 0 0% 1600 26000 2 1600 1600 1600 1600 1600 1							104
Arsenic   3   3   100%   8   19							12933
Barium   3   3   100%   150   270   Beryllium   3   3   100%   0.53   0.89   Cadmium   3   3   100%   7.4   47   47   Calcium   3   3   100%   11000   13000   Chromium   3   3   100%   5.5   13   Copper   19   19   100%   26   5400   Cyanide, Total   3   0   0%   14000   26000   7.4   7.5							2.55
Beryllium   3   3   100%   0.53   0.89   Cadmium   3   3   100%   7.4   47   Calcium   3   3   100%   7.4   47   Calcium   3   3   100%   11000   13000   Chromium   3   3   100%   19   38   Cobalt   3   3   100%   5.5   13   Copper   19   19   100%   26   5400   Cyanide, Total   3   0   0%   Cyanide, Total   3   0   0%   Cyanide, Total   3   100%   14000   26000   7   7   7   7   7   7   7   7   7							14.0
Cadmium         3         3         100%         7.4         47           Calcium         3         3         100%         11000         13000           Chromium         3         3         100%         19         38           Cobalt         3         3         100%         5.5         13           Copper         19         19         100%         26         5400           Cyanide, Total         3         0         0%         26         5400           Iron         3         3         100%         14000         26000         26000           Lead         3         3         100%         14000         26000         26000           Margnesium         3         3         100%         110         320         320           Manganese         3         3         100%         4100         6800         30         1.1         30         30         1.1         30 <t< td=""><td>—</td><td></td><td></td><td></td><td></td><td></td><td>223</td></t<>	—						223
Calcium   3   3   100%   11000   13000   Chromium   3   3   100%   19   38   Cobalt   3   3   100%   5.5   13   Copper   19   19   100%   26   5400   Cyanide, Total   3   0   0%   14000   26000   2   26000   2   2   2   2   2   2   2   2   2							0.76
Chromium							23
Cobalt         3         3         100%         5.5         13           Copper         19         19         100%         26         5400           Cyanide, Total         3         0         0%         26000         2           Iron         3         3         100%         14000         26000         2           Lead         3         3         100%         110         320         30           Magnesium         3         3         100%         4100         6800         30           Marganese         3         3         100%         170         510         510           Mercury         3         3         100%         0.7         3.7         Nickel         3         100%         0.7         3.7         Nickel         3         100%         90         390 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>11667</td>							11667
Copper   19   19   100%   26   5400						38	29
Cyanide, Total         3         0         0%         14000         26000         2           Lead         3         3         100%         110         320         3         100%         110         320         3         100%         110         320         3         100%         110         320         3         100%         110         320         3         100%         110         320         3         100%         170         510         410         410         6800         410         410         6800         410         6800         410         410         6800         410         6800         410         6800         410         410         6800         41							9,8
Iron					26	5400	1100
Lead   3   3   100%   110   320				4000	44000	00000	0.95
Magnesium         3         3         100%         4100         6800           Manganese         3         3         100%         170         510           Mercury         3         3         100%         0.3         1.1           Molybdenum         3         3         100%         0.7         3.7           Nickel         3         3         100%         90         390           Potassium         3         3         100%         90         390           Selenium         3         0         0%         0%         0%         0%           Sodium         3         0         0%							20667
Manganese         3         3         100%         170         510           Mercury         3         3         100%         0.3         1.1           Molybdenum         3         3         100%         0.7         3.7           Nickel         3         3         100%         90         390           Potassium         3         3         100%         90         390           Selenium         3         0         0%         500         0%         500			3				180
Mercury         3         3         100%         0.3         1.1           Molybdenum         3         3         100%         0.7         3.7           Nickel         3         3         100%         90         390           Potassium         3         3         100%         90         390           Selenium         3         0         0%         2900           Silver         3         0         0%         0%           Thallium         3         0         0%         0           Vanadium         3         3         100%         25         51           Zinc         19         19         100%         510         11000           pH         3         3         100%         551         11000           pH         3         3         100%         510         11000           pH         3         3         100%         551         11000           pH         3         3         100%         551         11000           pH         3         3         100%         50         14000         10           pH         3         3 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>5400</td>							5400
Molybdenum         3         3         100%         0.7         3.7           Nickel         3         3         100%         90         390           Potassium         3         3         100%         1600         2900           Selenium         3         0         0%         0%           Sodium         3         0         0%         0%           Thallium         3         0         0%         0%           Vanadium         3         3         100%         25         51           Zinc         19         19         100%         510         11000           pH         3         3         100%         5.71         6.87           tal Organic Carbon (mg/kg dry         19         19         100%         5.71         6.87           tal Organic Carbon (mg/kg dry         19         19         100%         5.71         6.87           tal Organic Carbon (mg/kg dry         19         19         100%         5.71         6.87           tal Organic Carbon (mg/kg dry         19         19         100%         15000         140000           Decachlorobiphenyl         19         0         0%							303
Nickel   3   3   100%   90   390							0.62
Potassium   3				100%			1.7
Selenium   3							220
Silver					1000	2900	2400
Sodium							1.8
Thallium         3         0         0%           Vanadium         3         3         100%         25         51           Zinc         19         19         100%         510         11000           pH         3         3         100%         6.71         6.87           tal Organic Carbon (mg/kg dry         19         19         100%         15000         140000         5           Decachlorobiphenyl         19         13         68%         32         460 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>1.8 132</td></t<>							1.8 132
Vanadium         3         3         100%         25         51           Zinc         19         19         100%         510         11000           pH         3         3         100%         510         11000           pH         3         3         100%         510         11000           tal Organic Carbon (mg/kg dry         19         19         100%         15000         140000           Decachlorobiphenyl         19         13         68%         32         460           Dichlorobiphenyl         19         0         0%         0%           Heptachlorobiphenyl         19         11         58%         13         260           Hexachlorobiphenyl         19         3         16%         17         22           Monochlorobiphenyl         19         0         0%         0%         0%           Nonachlorobiphenyl         19         11         58%         21         270         0ctachlorobiphenyl         19         11         58%         21         270         0ctachlorobiphenyl         19         17         89%         13         3700         18         1600         18         1600         18							
Zinc   19   19   100%   510   11000   pH   3   3   3   100%   6.71   6.87   121   Organic Carbon (mg/kg dry   19   19   100%   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   150						<u> </u>	1.8 39
Dear Organic Carbon (mg/kg dry   19   19   100%   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000							4848
Decachlorobiphenyl   19   19   100%   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   140000   15000   15000   15000   15000   150000   150	-						6.81
Decachlorobiphenyl   19	•						55237
Dichlorobiphenyl   19							103
Heptachlorobiphenyl         19         11         58%         13         260           Hexachlorobiphenyl         19         3         16%         17         22           Monochlorobiphenyl         19         0         0%         0%           Nonachlorobiphenyl         19         11         58%         21         270           Octachlorobiphenyl         19         8         42%         5.8         27           Pentachlorobiphenyl         19         17         89%         13         3700           Tetrachlorobiphenyl         19         12         63%         18         1600           Trichlorobiphenyl         19         4         21%         6.4         17           I otal PCBs         19         17         89%         76         6471           4,4'-DDD         3         1         33%         3.8         3.8           4,4'-DDE         3         3         100%         2.5         11           4,4'-DDT         3         1         33%         4.5         4.5           Total DDT         3         3         100%         19         43           Aldrin         3         1						700	7.7
Hexachlorobiphenyl   19   3   16%   17   22					13	260	49
Monochlorobiphenyl         19         0         0%           Nonachlorobiphenyl         19         11         58%         21         270           Octachlorobiphenyl         19         8         42%         5.8         27           Pentachlorobiphenyl         19         17         89%         13         3700           Tetrachlorobiphenyl         19         12         63%         18         1600           Trichlorobiphenyl         19         4         21%         6.4         17           I otal PCBs         19         17         89%         76         6471           4,4'-DDD         3         1         33%         3.8         3.8           4,4'-DDE         3         3         100%         2.5         11           4,4'-DDT         3         1         33%         4.5         4.5           Total DDT         3         3         100%         19         43           Aldrin         3         1         33%         4.1         4.1           Alpha-BHC         3         0         0%         0.84         5.3           alpha-BHC         3         0         0%         0%	Heyachlorobinhenyl		<del>'3'</del>		<del>13</del>		17
Nonachlorobiphenyl         19         11         58%         21         270           Octachlorobiphenyl         19         8         42%         5.8         27           Pentachlorobiphenyl         19         17         89%         13         3700           Tetrachlorobiphenyl         19         12         63%         18         1600           Trichlorobiphenyl         19         4         21%         6.4         17           I otal PCBs         19         17         89%         76         6471           4,4'-DDD         3         1         33%         3.8         3.8           4,4'-DDE         3         3         100%         2.5         11           4,4'-DDT         3         1         33%         4.5         4.5           Total DDT         3         3         100%         19         43           Aldrin         3         1         33%         4.1         4.1           Alpha-BHC         3         0         0%         084         5.3           alpha-BHC         3         0         0%         0%							7.7
Octachlorobiphenyl         19         8         42%         5.8         27           Pentachlorobiphenyl         19         17         89%         13         3700           Tetrachlorobiphenyl         19         12         63%         18         1600           Trichlorobiphenyl         19         4         21%         6.4         17           Lotal PCBs         19         17         89%         76         6471           4,4'-DDD         3         1         33%         3.8         3.8           4,4'-DDE         3         3         100%         2.5         11           4,4'-DDT         3         1         33%         4.5         4.5           Total DDT         3         3         100%         19         43           Aldrin         3         1         33%         4.1         4.1           Alpha Chlordane         3         3         100%         0.84         5.3           alpha-BHC         3         0         0%         0%					<del>21</del>	270	54
Pentachlorobiphenyl         19         17         89%         13         3700           Tetrachlorobiphenyl         19         12         63%         18         1600           Trichlorobiphenyl         19         4         21%         6.4         17           I otal PCBs         19         17         89%         76         6471           4,4'-DDD         3         1         33%         3.8         3.8           4,4'-DDE         3         3         100%         2.5         11           4,4'-DDT         3         1         33%         4.5         4.5           Total DDT         3         3         100%         19         43           Aldrin         3         1         33%         4.1         4.1           Alpha Chlordane         3         3         100%         0.84         5.3           alpha-BHC         3         0         0%         0%           beta-BHC         3         0         0%							25
Tetrachlorobiphenyl         19         12         63%         18         1600           Trichlorobiphenyl         19         4         21%         6.4         17           I otal PCBs         19         17         89%         76         6471           4,4'-DDD         3         1         33%         3.8         3.8           4,4'-DDE         3         3         100%         2.5         11           4,4'-DDT         3         1         33%         4.5         4.5           Total DDT         3         3         100%         19         43           Aldrin         3         1         33%         4.1         4.1           Alpha Chlordane         3         3         100%         0.84         5.3           alpha-BHC         3         0         0%         0%           beta-BHC         3         0         0%							504
Trichlorobiphenyl I otal PCBs         19         4         21% 89% 76         6.4         17           4,4'-DDD         3         1         33% 3.8         3.8           4,4'-DDE         3         3         100% 2.5         11           4,4'-DDT         3         1         33% 4.5         4.5           Total DDT         3         3         100% 19         43           Aldrin         3         1         33% 4.1         4.1           Alpha Chlordane         3         3         100% 0.84         5.3           alpha-BHC         3         0         0%           beta-BHC         3         0         0%							197
I otal PCBs         19         17         89%         76         6471           4,4'-DDD         3         1         33%         3.8         3.8           4,4'-DDE         3         3         100%         2.5         11           4,4'-DDT         3         1         33%         4.5         4.5           Total DDT         3         3         100%         19         43           Aldrin         3         1         33%         4.1         4.1           Alpha Chlordane         3         3         100%         0.84         5.3           alpha-BHC         3         0         0%         0%           beta-BHC         3         0         0%							9.5
4,4'-DDD       3       1       33%       3.8       3.8         4,4'-DDE       3       3       100%       2.5       11         4,4'-DDT       3       1       33%       4.5       4.5         Total DDT       3       3       100%       19       43         Aldrin       3       1       33%       4.1       4.1         Alpha Chlordane       3       3       100%       0.84       5.3         alpha-BHC       3       0       0%       0%         beta-BHC       3       0       0%		19		89%			929
4,4'-DDE     3     3     100%     2.5     11       4,4'-DDT     3     1     33%     4.5     4.5       Total DDT     3     3     100%     19     43       Aldrin     3     1     33%     4.1     4.1       Alpha Chlordane     3     3     100%     0.84     5.3       alpha-BHC     3     0     0%       beta-BHC     3     0     0%							11
4,4'-DDT     3     1     33%     4.5     4.5       Total DDT     3     3     100%     19     43       Aldrin     3     1     33%     4.1     4.1       Alpha Chlordane     3     3     100%     0.84     5.3       alpha-BHC     3     0     0%       beta-BHC     3     0     0%							7.2
Total DDT         3         3         100%         19         43           Aldrin         3         1         33%         4.1         4.1           Alpha Chlordane         3         3         100%         0.84         5.3           alpha-BHC         3         0         0%         0%         0%         0%           beta-BHC         3         0         0%		<del>3</del> 1	<del></del>				11
Aldrin     3     1     33%     4.1     4.1       Alpha Chlordane     3     3     100%     0.84     5.3       alpha-BHC     3     0     0%       beta-BHC     3     0     0%		<del>3</del>					30
Alpha Chlordane     3     3     100%     0.84     5.3       alpha-BHC     3     0     0%       beta-BHC     3     0     0%							6.4
alpha-BHC         3         0         0%           beta-BHC         3         0         0%		<del> </del>					3.6
beta-BHC 3 0 0%			<del></del>		0.04		1.9
JG12-3110 3 0 0/6							1.9
delta-BHC 3 1 33% 0.34 0.34	delta-BHC	3		33%	<u> </u>	0.34	1.6
Dieldrin 3 2 67% 0.99 9.3							9.3

Appendix C-2.9

### Sediment Summary Statistics for Dead Creek Sector F (Combined Shallow (0-2 inch) and Deep "Industry Specific" Samples) Sauget Area I

Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentratio
Endosulfan I	3	3	100%	1.2	5.7	3.0
Endosulfan II	3	3	100%	1.8	8.1	5.1
Endosulfan sulfate	3	Ĭ	33%	2.8	2.8	11
Endrin	3	2	67%	1.7	1.7	7.0
Endrin aldehyde	3	3	100%	3.6	14	8.9
Endrin ketone	3	3	100%	3.8	10	7.0
Gamma Chlordane	3	3	100%	2.4	17	9.0
gamma-BHC (Lindane)	3	ő	0%	f::Z	<del>- '</del>	6.3
Heptachlor	3	1	33%	0.93	0.93	4.6
Heptachior epoxide	3	2	53 A	0.55	5.4	5.0
Methoxychlor	3	3	100%	7.3	24	15
l oxaphene	3	0	0%	- 1.3		630
1.2.4-Trichlorobenzene	3	0	0%		_	318
	3	0	0% 0%			
1,2-Dichlorobenzene 1,3-Dichlorobenzene	3	0	0%			318 318
. *5.7 *5.27 *5.7 *5.7	_					
1,4-Dichlorobenzene	3	0	0%			318
2.2-Oxybis(1-Chloropropane)	3	0	0%			318
2.4.5-Trichlorophenol	3	0	0%			318
2,4,6-Trichlorophenol	3	0	0%			318
2,4-Dichlorophenol	3	0	0%			318
2.4-Dinitrophenol	3	0	.0%			1600
2.4-Dinitrotoluene	3	0	0%			318
2,6-Dinitrotoluene	3	0	0%			318
2-Chloronaphthalene	3	0	0%			318
2-Chlorophenol	3	0	0%			318
2-Methylnaphthalene	3	0	0%			318
2-Methylphenol (o-cresol)	3	0	0%			318
2-Nitroaniline	3	0	0%			1600
2-Nitrophenol	3	0	0%			318
3,3'-Dichlorobenzidine	3	0	0%			612
3-Methylphenol/4-Methylphenol	3	O	0%			318
3-Nitroaniline	3	0	0%			1600
4,6-Dinitro-2-methylphenol	3	0	0%			1600
4-Bromophenylphenyl ether	3	0	0%			318
4-Chloro-3-methylphenol	3	0	0%			318
4-Chloroaniline	3	0 1	0%			612
4-Chlorophenylphenyl ether	3	0	0%			318
4-Nitroaniline	3	ŏ	0%			1600
4-Nitrophenol	3	ŏ	0%			1600
Acenaphthene	3		0%			318
Acenaphthylene	3	ŏ	0%			318
Anthracene	3	Ö	0%			318
Benzo(a)anthracene	3	0 -	0%			318
Benzo(a)pyrene	3	0	0%			168
Benzo(b) fluoranthene	3	0	0%			318
Benzo(g.h.i)perylene	3		0%			
Bookeriff in the Age is	3	0				318
Benzo(k)fluoranthene		- 1	0%	ļ		318
bis(2-Chloroethoxy)methane	3 -	0	0%			318
bis(2-Chloroethyl)ether	_3	0	0%			318
bis(2-Ethylhexyl)phthalate	3	0	0%			318
Butylbenzylphthalate	3	0	0%			318
Carbazole	3	0	0%			318
Chrysene	3	1	33%	74	74	276
Di-n-butylohthalate	3	0	0%			318
Di-n-octylphthalate	3	0	0%			318
Dibenzo(a,h)anthracene	3	0	0% ]			168
Dibenzofuran	3	0	0%	- 1		318
Diethylphthalate	3	0	0% ~~~			318
Dimethylphthalate	3	0	0%			318

### Sediment Summary Statistics for Dead Creek Sector F (Combined Shallow (0-2 inch) and Deep "Industry Specific" Samples) Sauget Area I

Compounds         Analyzed         Detected         Detected         Detected         Concernic           Fluorenthene         3         2         67%         120         130         130           Fluorene         3         0         0%	erage entration 232 318 132 318 318 318 318
Fluorene         3         0         0%           Hexachlorobenzene         3         0         0%           Hexachlorobutadiene         3         0         0%           Hexachlorocyclopentadiene         3         0         0%           Hexachloroethane         3         0         0%           Indeno(1,2,3-cd)pyrene         3         0         0%           Isophorone         3         0         0%           N-Nitroso-di-n-propylamine         3         0         0%	318 132 318 318 318
Hexachlorobenzene         3         0         0%           Hexachlorobutadiene         3         0         0%           Hexachlorocyclopentadiene         3         0         0%           Hexachloroethane         3         0         0%           Indeno(1,2,3-cd)pyrene         3         0         0%           Isophorone         3         0         0%           N-Nitroso-di-n-propylamine         3         0         0%	132 318 318 318
Hexachlorobutadiene         3         0         0%           Hexachlorocyclopentadiene         3         0         0%           Hexachloroethane         3         0         0%           Indeno(1,2,3-cd)pyrene         3         0         0%           Isophorone         3         0         0%           N-Nitroso-di-n-propylamine         3         0         0%	318 318 318
Hexachlorocyclopentadiene         3         0         0%           Hexachloroethane         3         0         0%           Indeno(1,2,3-cd)pyrene         3         0         0%           Isophorone         3         0         0%           N-Nitroso-di-n-propylamine         3         0         0%	318 318
Hexachlorocyclopentadiene         3         0         0%           Hexachloroethane         3         0         0%           Indeno(1,2,3-cd)pyrene         3         0         0%           Isophorone         3         0         0%           N-Nitroso-di-n-propylamine         3         0         0%	318
Hexachloroethane	318
Indeno(1,2,3-cd)pyrene         3         0         0%           Isophorone         3         0         0%           N-Nitroso-di-n-propylamine         3         0         0%	
Isophorone	
N-Nitroso-di-n-propylamine 3 0 0%	318
	318
N-Nitrosodiphenylamine 3 0 0%	318
	318
	318
	600
	318
	318
	318
	360
	4.0
	4.0
	4.0
	4.0 3.0
	4.0
	4.0
	9.2
	9.2
	9.2
	145
	4.0
	4.0
	4.0
	7.8
	4.0
	4.0
	4.0
	7.8
	4.0
	7.8
	1.2
Cis/Trans-1,2-Dichloroethene 3 0 0% 1	4.0
Dibromochloromethane 3 0 0% 1	4.0
Ethylbenzene 3 1 33% 11 11 11	3.3
Methylene chloride (Dichloromethane) 3 0 0% 1	4.0
Styrene 3 0 0% 1	4.0
	4.0
	4.0
	1.2
	4.0
	7.8
	4.0

#### Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

Appendix C-2.10

### Sediment Summary Statistics for Borrow Pit Lake (Shallow (0-2 inches) and Deep "Industry Specific" Sediments) Sauget Area I

	<del>,</del>		<del>,</del>			<del></del>
	1					
	Number	Number	Frequency Of	Minimum	Maximum	Average
Compounds 2.4.5-T	Analyzed	Detected	Detection 0%	Detected	Detected	Concentration 12
2.4.5-TP (Silvex)	3 3	ŏ	0%			12
2.4-0	3	2	67%	8.8	11	11
2,4-08	3	0	0%			12
Dalapon	3	0	0%			92
Dicamba	<b>[</b> 3 ]	0	0%			28
Dichloroprop	3	0	0%			142
Dinoseb	3	0	0%			142
MCPA	3	0	0%			2817
MCPP Pentachiorophenoi	3 3	0	0% 0%			2817 24
Auminum	3	3	100%	11000	16000	13667
Antimony	3	2	67%	1.5	2.2	2.22
Arsenic	3	3	100%	13	17	16
Barium	3	3	100%	240	420	350
Beryllium	3	3	100%	0.58	0.82	0.71
Cadmium	] 3	3	100%	1.6	2.7	2.1
Calcium	3	3	100%	11000	17000	14667
Chromium	3	3	100%	18	26	22
Cobalt	3	3	100%	7.1	10	8.9
Copper	24	24	100%	9.9	370	44
Cyanide, Total	3	0	0%	20000	20000	0.72
lron	3	3	100% 100%	28000 34	<u>38000</u> 58	34000 48
Lead Magnesium	3 3	3 3	100%	3600	5600	4667
Manganese	3	3	100%	940	1400	1213
Mercury	3	3	100%	0.1	0.16	0.12
Molybdenum	3	3	100%	0.37	0.92	0.60
Nickel	3 1	3	100%	35	54	47
Potassium	3	3	100%	1500	2200	1967
Selenium	3 ]	0	0%			1,4
Silver	] 3 [	1 ]	33%	0.79	0.79	1.1
Sodium	3	0	0%			93
Thallium	3	0	0%	44		1.4
Vanadium ∠inc	3	3	100%	28	40	35
	24	24	100%	50 6.74	2100 7.06	354 6.94
Total Organic Carbon (mg/kg dry			100%	0.74	7.00	0.5=
weight)	24	24	100%	3900	67000	20596
Decachiorobiphenyl	24	1	4%	33	33	25
Dichlorobiphenyl	24	Ó	0%	T <del></del>		4.8
Heptachlorobiphenyl	24	0	0%			15
Hexachlorobiphenyl	[ 24 ]	0	0%			9.9
Monochlorobiphenyl	24	0	0%			4.8
Nonachiorobiphenyl	24	2	8%	10	250	25
Octachlorobiphenyl	24	0	0%			15
Pentachlorobiphenyl	24	2	8%	140	160	18
Tetrachlorobiphenyl	24	_ 1	4%	48	48	12
Trichlorobiphenyl Lotal PCBs	24 24	0 3	0% 13%	. 32	705	<u>4.8</u> 55
4,4'-000	3	0	0%	J <u>Z</u>		8.5
4.4'-DDE	3	3	100%	1.1	3.2	2.0
4.4'-DDT	3	2	67%	1.1	1.4	4.0
Total DOT	3	3	100%	2.2	12.7	6.0
Aldrin	3	Ö	0%			4.4
Alpha Chlordane	3 [	3	100%	0.48	3.2	1.6
alpha-BHC	3 [	0	0%			1.3
beta-BHC	3 1	0	0%			1.3
delta-BHC	3	0	0%			1.3
Dieldrin	3	2	67%	0.26	0.5	3.3
Endosulfan I	3	3	100%	1 _	4.9	2.9
Endosulfan II	3	0	0%			8.5
Endosulfan sulfate	3	2	67%	1.4	9.5	6.6

## Sediment Summary Statistics for Borrow Pit Lake (Shallow (0-2 inches) and Deep "Industry Specific" Sediments) Sauget Area I

	Number	Norman and	Erogue - Of	Minimo	Maylman	Augus
Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
Endrin	3	0	0%			8.5
Endrin aldehyde	3	3	100%	1.2	2.2	1.6
Endrin ketone	3	1	33%	0.72	0.72	6.4
Gamma Chlordane	3	2	67%	0.74	3	2.8
gamma-BHC (Lindane)	3	1	33%	4.8	4.8	4.8
Heptachlor	3	0	0%		<u>-</u> -	4.4
Heptachlor epoxide Methoxychlor	3	1	33%	4.8	4.8	4.8
l oxaphene	3	0	0% 0%			44 440
1.2.4-Trichlorobenzene	3	0	0%			240
1,2-Dichlorobenzene	3	<del>0</del>	0%			240
1,3-Dichlorobenzene	3	Ö	0%			240
1,4-Dichlorobenzene	3	· o	0%			240
2,2'-Oxybis(1-Chloropropane)	3	O	0%			240
2,4,5-Trichlorophenol	3	0	0%	\		240
2,4,6-Trichlorophenol	3	0	0%			240
2,4-Dichlorophenol	3	0	0%			240
2,4-Dinitrophenol	3	0	0%			1200
2,4-Dinitrotoluene	3	0	0%			240
2,6-Dinitrotoluene	3	0	0%			240
2-Chloronaphthalene	3	0	0%			240
2-Chlorophenol	3	0	0%			240
2-Methylnaphthalene 2-Methylphenol (o-cresol)	3	0	0% 0%			240
2-Methylphenol (0-cresol) 2-Nitroaniline	3	- 6 -	0%			240 1200
2-Nitrophenol	3	- 6 -	0%			240
3,3'-Dichlorobenzidine	3	<del>0</del>	0%			463
3-Methylphenol/4-Methylphenol	3	<del>- 0</del> -	0%			240
3-Nitroaniline	3	<del>-</del>	0%			1200
4,6-Dinitro-2-methylphenol	3	<del>ŏ</del> (	0%			1200
4-Bromophenylphenyl ether	3	ō	0%			240
4-Chloro-3-methylphenol	3	0	0%			240
4-Chloroaniline	3	0	0%			463
4-Chlorophenylphenyl ether	3	0	0%			240
4-Nitroaniline	3	0	0%			1200
4-Nitrophenol	3	0	0%			1200
Acenaphthene	3	0	0%			240
Acenaphthylene	3	0	0%			240
Anthracene	3	0	0%			240
Benzo(a)anthracene	3	0	0% 0%			240 127
Benzo(a)pyrene Benzo(b)fluoranthene	3		0%			240
Benzo(g,h,i)perylene	<u> </u>		0%			240
Benzo(k)fluoranthene	3	0	0%			240
bis(2-Chloroethoxy)methane	$-\frac{3}{3}$	<del>-</del> 0	0%			240
bis(2-Chloroethyl)ether	3	0	0%			240
bis(2-Ethylhexyl)phthalate	3	Ö	0%			240
Butylbenzylphthalate	3	0	0%			240
Carbazole	3	0	0%			240
Chrysene	3	0	0%			240
Di-n-butylphthalate	3	0	0%			240
Di-n-octylphthalate	3	0	0%			240
Dibenzo(a,h)anthracene	3	0	0%			127
Dibenzofuran	3	0	0%			240
Diethylphthalate	3	0	0%			240
Dimethylphthalate	3	0	0%			240
Fluoranthene	3	0	0%			240
Fluorene	3	0	0%			240
Hexachlorobenzene	3	0	0%			97
Hexachlorobutadiene	3	0	0%			240
Hexachlorocyclopentadiene	3	0	0%	,.,		240
Hexachloroethane	3		0% 0%			240
Indeno(1,2,3-cd)pyrene_	<u> </u>		U 70			240

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### Sediment Summary Statistics for Borrow Pit Lake (Shallow (0-2 inches) and Deep "Industry Specific" Sediments) Sauget Area I

	T ——				_	
Compounds	Number Analyzed	Number Detected	Frequency Of Detection	Minimum Detected	Maximum Detected	Average Concentration
Isophorone	3	Ó	0%			240
N-Nitroso-di-n-propytamine	3	0	0%		**	240
N-Nitrosodiphenylamine	3	0	0%			240
Naphthalene	3	0	0%			240
Nitrobenzene	3	0	0%			240
Pentachlorophenol	3	0	0%			1200
Phenanthrene	3	0	0%	_		240
Phenol	3	0	0%			240
Pyrene	3	0	0%			240
Iotal PAHs	3	0	0%			240
1,1,1-Trichloroethane	3	0	0%			13
1,1,2,2-Tetrachloroethane	3	0	0%			13
1,1,2-Trichloroethane	3	0	0%			13
1,1-Dichloroethane	3	0	0%			13
1,1-Dichloroethene	3	0	0%			12
1,2-Dichloroethane	[ 3	0	0%		_	13
1,2-Dichloropropane	3	0	0%			13
2-Butanone (MEK)	[ 3 ]	0	0%			65
2-Hexanone	[ 3	0	0%			65
4-Methyl-2-pentanone (MIBK)	3	0	0%			65
Acetone	[ 3 ]	0	0%			130
Benzene	3	0	0%			13
Bromodichloromethane	3	0	0%			13
Bromoform	3	0	0%		_]	13
Bromomethane (Methyl bromide)	3	0	0%			26
Carbon disulfide	3	0	0%			13
Carbon tetrachloride	3	0 [	0%		_	13
Chlorobenzene	3	0	0%			13
Chloroethane	3 [	0	0%			26
Chloroform	3	0	0%			13
Chloromethane	3	0	0%			26
cis-1,3-Dichloropropene	3	0	0%			10
Cis/Trans-1,2-Dichloroethene	3	0	0%			13
Dibromochloromethane	3	0	0%			_ 13
Ethylbenzene	3	0	0%			13
Methylene chloride (Dichloromethane)	3	0	0%			13
Styrene	3	0	0%			13
Tetrachloroethene	3	0	0%			13
Toluene	3	0	0%			13
trans-1,3-Dichloropropene	3	0	0%			10
Trichloroethene	3	0	0%	·		13
Vinyl chloride	3	0	0%	]		26
Xylenes, Total	3	0	0%			13

#### Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

Comparison of Detection Limits to Sediment Quality Guidelines Dead Creek Segment F and Borrow Pit Lake Shallow Sediment Sauget Area I

	Maximum	Sediment	Florida	0	4.0000.6		
	Detection Limit	Quality Guidelines <sup>1</sup>	Florida SQAG <sup>2</sup>	Ontario Guidelines <sup>3</sup>	A COPC for this		
Compounds	or Range	TEC	TEL	LEL	Medium?	Why was this a COPC?	Comment on detection limits.
Herbicides (ug/kg)							The state of the s
2,4,5-T	240				No		No criteria available to evaluate detection limit.
2,4,5-TP (Silvex)	240				No		No criteria available to evaluate detection limit.
2,4-D	240				Yes	No criteria; greater than background	No criteria available to evaluate detection limit.
2,4-DB	240				No		No criteria available to evaluate detection limit.
Dalapon	2000				No		No criteria available to evaluate detection limit.
Dicamba	570				No		No criteria available to evaluate detection limit.
Dichloroprop	2900				No		No criteria available to evaluate detection limit.
Dinoseb	2900				No		No criteria available to evaluate detection limit.
MCPA	57000				No		No criteria available to evaluate detection limit.
MCPP	57000				No		No criteria available to evaluate detection limit.
Pentachlorophenol	490				No		No criteria available to evaluate detection limit.
Metals (mg/kg)							The street of th
Aluminum	All Detected				No		No criteria available to evaluate detection limit.
Antimony	5.9				Yes	No criteria; greater than background	No criteria available to evaluate detection limit.
Arsenic	All Detected	9.79	7.24	6	Yes	Greater than criteria and background	Detected in all samples.
Barium	All Detected				Yes	No criteria; greater than background	No criteria available to evaluate detection limit.
Beryllium	All Detected			1	No		No criteria available to evaluate detection limit.
Cadmium	All Detected	0.99	0.676	0.6	Yes	Greater than criteria and background	Detected in all samples.
Calcium	All Detected				No		No criteria - a common nutrient.
Chromium	All Detected	43.4	52.3	26	Yes	Greater than criteria.	Detected in all samples.
Cobalt	All Detected			50	No		Detected in all samples.
Copper	All Detected	31.6	18.7	16	Yes	Greater than criteria and background	Detected in all samples.
Cyanide, Total	1,2 to 2.6			0.1	No		Detection limits greater than criteriain 6/6 samples;
[ ]							source of uncertainty.
Iron	All Detected			20000	Yes	Greater than criteria	Detected in all samples.
Lead	All Detected	35.8	30.2	31	Yes	Greater than criteria and background	Detected in all samples.
Magnesium	All Detected				No		No criteria - a common nutrient.
Manganese	All Detected			460	Yes	Greater than criteria.	Detected in all samples.
Mercury	All Detected	0.18	0.13	0.2	Yes	Greater than criteria and background	Detected in all samples.
Molybdenum	All Detected				Yes	No criteria; greater than background	No criteria available to evaluate detection limit.
Nickel	All Detected	22.7	15.9	16	Yes	Greater than criteria; greater than background	Detected in all samples.
Potassium	All Detected				No		No criteria - common nutrient.
Selenium	4.8				No		No criteria available to evaluate detection limit.
Silver	2.3 to 4.8		0.733	0.5	Yes	Detected at a concentration higher than the criteria.	Detection limit greater than criteria in 5/6 samples: source of uncertainty.
Sodium	350				No		No criteria - common nutrient.
Thallium	4.8		1		No		No criteria available to evaluate detection limit.
Vanadium	All Detected		T		No		No criteria available to evaluate detection limit.
Zinc	All Detected	121	124	120	Yes	Greater than criteria and background	Detected in all samples.
pH	All Detected		T		No	NA	NA
Total Organic Carbon (mg/kg dr			T		No	NA	NA

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#### Comparison of Detection Limits to Sediment Quality Quidelines Dead Creek Segment F and Borrow Pit Lake Shallow Sediment Sauget Area I

Compounds	Maximum Detection Limit or Range	Sediment Quality Guidelines <sup>1</sup> TEC	Florida SQAG <sup>2</sup> TEL	Ontario Guidelines <sup>3</sup> LEL			
Compounds	Of Italige	150	IEL	LEL	Medium?	Why was this a COPC?	Comment on detection limits.
PCBs and Pesticides (ug/kg)			Ì		l		
Decachloroblphenyl	310			ļ	No		No criteria available to evaluate detection limit.
Dichlorobiphenyi	60		]		No	1	No criteria available to evaluate detection limit.
Heptachlorobiphenyl	180				No	1	No criteria avallable to evaluate detection limit.
Hexachlorobiphenyl	120		l	Į.	No	(	No criteria available to evaluate detection limit.
Monochlorobiphenyl	60				No	ļ.	No criteria available to evaluate detection limit.
Nonachlorobiphenyl	310		ŀ		No		No criteria available to evaluate detection limit.
Octachlorobiphenyl	180				No		No criteria available to evaluate detection limit.
Pentachlorobiphenyl	120				No		No criteria available to evaluate detection limit.
Tetrachlorobiphenyl	120				No	ļ	No criteria available to evaluate detection limit.
Trichlorobiphenyl	60			ļ	No	1	No criteria available to evaluate detection limit.
Total PCBs	19 to 120	59.8	21.6	70	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 2/6 samples; source of uncertainty.
4.4'-DDD	14 to 35	4.88	1.22	8	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 5/6 samples; source of uncertainty
4,4'-DDE	All Detected	3.16	2.07	5	Yes	Greater than criteria; ND in background	Detected in all samples.
4,4'-DDT*	19 to 35	4.16	1.19	8	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 3/6 samples; source of uncertainty.
Total DDT	All Detected	5.28	3.89	7	Yes	Greater than criteria; ND in background	Concentration is sum of concentrations of DDE, DDD, and DDT.
Aldrin	7.1 to 18			2	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 5/6 samples; source of uncertainty.
Alpha Chlordane**	All Detected	3.24	2.26	7	Yes	Greater than criteria; ND in background	Detected in all samples
alpha-BHC	5.3	1 5.2 1	1	6	No		Detection limits less than criteria.
beta-BHC	2.3 to 5.3	İ	İ	5	No	•	Detection limit greater than criteria in 1/6 samples;
	2.5 15 5.5						source of uncertainty.
delta-BHC	5.3			Ì	Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Dieldrin	18 to 35	1.9	0.715	2	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 2/6 samples;
	10.000	'."	0.,,	•		Ground man district the middle of the	source of uncertainty.
Endosulfan I	All Detected		1	1	Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Endosulfan II	19	1	1	İ	Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Endosulfan sulfate	35	1			Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Endrin	14 to 35	2.22	İ	3	No		Detection limit greater than criteria in 4/6 samples;
Endrin	14 (0 35	4.24		"	1		source of uncertainty.
Endrin aldehyde	All Detected			Ì	Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Endrin aldenyde Endrin ketone	19		1	İ	Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Gamma Chlordane**	9.4	3.24	2.26	7	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 1/6 samples;
		-,-,		1		,	source of uncertainty.
gamma-BHC (Lindane)	7.8 to 18	2.37	0.32	3	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 5/6 samples; source of uncertainty.
Heptachlor	7.1 to 18			0.3 NEL	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 5/6 samples; source of uncertainty.
Heptachlor epoxide	9.4 to 18	2.47		5	Yes	Greater than criteria; ND in background	Detection limit greater than criteria in 3/6 samples; source of uncertainty.

#### Comparison of Detection Limits to Sediment Quality Guidelines Dead Creek Segment F and Borrow Pit Lake Shallow Sediment Sauget Area I

	Maximum	Sediment			· · · · ·	T T	<del></del>
	Detection	Quality	Florida	Ontario	A COPC for		1
	Limit	Guldelines <sup>1</sup>	SQAG <sup>2</sup>	Guidelines <sup>3</sup>	this	<u> </u>	
Compounds	or Range	TEC	TEL	LEL	Medium?	Why was this a COPC?	Comment on detection limits.
Methoxychlor	99				Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Toxaphene	1800				No		No criteria available to evaluate detection limit.
SVOCs ug/kg							
1,2,4-Trichlorobenzene	890				No		No criteria available to evaluate detection limit.
1,2-Dichlorobenzene	890				No		No criteria available to evaluate detection limit.
1,3-Dichlorobenzene	890				No		No criteria available to evaluate detection limit.
1,4-Dichlorobenzene	890				No		No criteria available to evaluate detection limit.
2,2'-Oxybis(1-Chloropropane)	890				No		No criteria available to evaluate detection limit.
2,4,5-Trichlorophenol	890				No		No criteria available to evaluate detection limit.
2,4,6-Trichlorophenol	890				No		No criteria available to evaluate detection limit.
2,4-Dichlorophenol	890				No		No criteria available to evaluate detection limit.
2,4-Dinitrophenol	4500				No		No criteria available to evaluate detection limit.
2,4-Dinitrotoluene	890				No		No criteria available to evaluate detection limit.
2,6-Dinitrotoluene	890				No		No criteria available to evaluate detection limit.
2-Chloronaphthalene	890				No		No criteria available to evaluate detection limit.
2-Chlorophenol	890	_			No		No criteria available to evaluate detection limit.
2-Methylnaphthalene	400 to 890		20.2		No		Detection limit greater than criteria in 6/6 samples;
							source of uncertainty.
2-Methylphenol (o-cresol)	890				No		No criteria available to evaluate detection limit.
2-Nitroaniline	4500				No		No criteria available to evaluate detection limit.
2-Nitrophenol	890	··			No		No criteria available to evaluate detection limit.
3,3'-Dichlorobenzidine	1700				No		No criteria available to evaluate detection limit.
3-Methylphenol/4-Methylphenol	890				No		No criteria available to evaluate detection limit.
3-Nitroanifine	4500			J	No		No criteria available to evaluate detection limit.
4,6-Dinitro-2-methylphenol	4500			t	No		No criteria available to evaluate detection limit.
4-Bromophenylphenyl ether	890	f -			No		No criteria available to evaluate detection limit.
4-Chloro-3-methylphenol	890			†	No		No criteria available to evaluate detection limit.
4-Chloroaniline	1700		<del> </del>	1	No		No criteria available to evaluate detection limit.
4-Chlorophenylphenyl ether	890	f		f	No		No criteria available to evaluate detection limit.
4-Nitroaniline	4500				No		No criteria available to evaluate detection limit.
4-Nitrophenol	4500			1 -	No		No criteria available to evaluate detection limit.
Acenaphthene	400 to 890		6.71	<u> </u>	No		Detection limit greater than criteria in 6/6 samples;
/ tochaphalone	100.000			i			source of uncertainty.
Acenaphthylene	400 to 890	<del></del>	5.87		No		Detection limit greater than criteria in 6/6 samples;
Chapitatyiono	755 15 555	ĺ		i		i	source of uncertainty.
Anthracene	400 to 890	57.2	46.9	220	No		Detection limit greater than criteria in 6/6 samples;
Allillacile	700 10 000	J 5: 12					source of uncertainty.
Benzo(a)anthracene	400 to 890	108	74.8	320	No	1	Detection limit greater than criteria in 6/6 samples;
Donzola Janun acene	700 10 030	1	' ''		1		source of uncertainty.
Benzo(a)pyrene	210 to 470	150	88.8	370	No		Detection limit greater than criteria (TEC, TEL) in
Delizo(a)pyrene	2.0 10 470	.50	55.5	""			6/6 samples; source of uncertainty.
Benzo(b)fluoranthene	890	<del> </del>	<del>                                     </del>	<del> </del>	No	<del>                                     </del>	No criteria available to evaluate detection limit.
Benzo(g,h,i)perylene	400 to 890	<del> </del>	<del> </del>	170	No	<del>                                     </del>	Detection limit greater than criteria in 6/6 samples;
Denzo(g,n,i)peryiene	700 (0 030	Į.	1	1 .,,	'"	1	source of uncertainty.

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#### Comparison of Detection Limits to Sediment Quality Guidelines Deed Creek Segment F and Borrow Pit Lake Shallow Sediment Sauget Area I

Compounds	Maximum Detection Limit or Range	Sediment Quality Guidelines <sup>1</sup> TEC	Florida SQAG <sup>2</sup> TEL	Ontario Guidelines <sup>3</sup> LEL	A COPC for this	Why was this a COPC?	Comment on detection limits.
Benzo(k)fluoranthene	400 to 890	- '		240	No	Timy was time a core of	
Denzo(k)nuoranunene	400 (0 890			240	No		Detection limit greater than criteria in 6/8 samples;
bis(2-Chloroethoxy)methane	890	<b>,</b>			l No	İ	source of uncertainty.
bis(2-Chloroethyl)ether	890				No No		No criteria available to evaluate detection limit.
bis(2-Ethylhexyl)phthalate	400 to 890	l	182		No No		No criteria available to evaluate detection limit.
Dia(E-Carymoxy), printinate	400 10 880		102	ì	140		Detection limit greater than criteria in 6/6 samples;
Butylbenzylphthalate	890			ŀ	No		source of uncertainty. No criteria available to evaluate detection limit.
Carbazole	890			j	No	:	No criteria available to evaluate detection limit.
Chrysene	470 to 890	166	108	340	No		Detection limit greater than criteria in 5/6 samples;
i vacino	1,010,000	, , , ,	'00	340	140		source of uncertainty.
Di-n-butylphthalate	890		1	i	No		No criteria available to evaluate detection limit.
Di-n-octylphthalate	890		1		No.	†	No criteria available to evaluate detection limit.
Dibenzo(a,h)anthracene	210 to 470	33.0	6.22	60	No	<u> </u>	Detection limit greater than criteria in 6/6 samples;
151001120(4,11)411111111100110	1 210 10 470	55.5	0.22	55	"		source of uncertainty.
Dibenzofuran	890				No	i	No criteria avallable to evaluate detection limit.
Diethylphthalate	890	1			No	†	No criteria available to evaluate detection limit.
Dimethylphthalate	890	ţ		1	No	†	No criteria available to evaluate detection limit.
Fluoranthene	470 to 890	423	113	750	Yes	Greater than criteria; ND in background	Detection limit greater than criteria (TEC, TEL) in
	1.0.000	'	'''				4/6 samples; source of uncertainty.
Fluorene	400 to 890	77.4	21.2	190	No	†	Detection limit greater than criteria in 6/6 samples;
	700 10 000	''''					source of uncertainty.
Hexachiorobenzene	160 to 370	1	t	20	No.		Detection limit greater than criteria in 6/6 samples;
T TO A BOTH TO TO TO TO TO TO TO TO TO TO TO TO TO	10010010		l	]	""		source of uncertainty.
Hexachlorobutadiene	890	1	i	1	No		No criteria available to evaluate detection limit.
Hexachlorocyclopentadiene	890	İ	† · ·		No	1	No criteria available to evaluate detection limit.
Hexachloroethane	890	İ		-	No	j	No criteria avallable to evaluate detection limit.
Indeno(1,2,3-cd)pyrene	400 to 890	1	ì	200	No	1	Detection limit greater than criteria in 6/6 samples;
	""				1		source of uncertainty.
Isophorone	890		1		No	Ī	No criteria available to evaluate detection limit.
N-Nitroso-di-n-propylamine	890		İ		No		No criteria available to evaluate detection limit.
N-Nitrosodiphenylamine	890	Ì	l	1	No	Ì	No criteria available to evaluate detection limit.
Naphthalene	400 to 890	176	34.6		i No		Detection limit greater than criteria in 6/6 samples
1	,		I	1			source of uncertainty.
Nitrobenzene	890	I	] .		No		No criteria available to evaluate detection limit.
Pentachlorophenol	4500	I	]	I	No.		No criteria available to evaluate detection limit.
Phenanthrene	400 to 890	204	86.7	560	No	1	Detection limit greater than criteria (TEC, TEL) in
	1	L	<u> </u>		1	<b>.</b>	6/6 samples; source of uncertainty.
Phenol	890		Į		No		No criteria available to evaluate detection limit.
Pyrene	400 to 890	195	153	490	No		Detection limit greater than criteria (TEC, TEL) in
		<u> </u>	<u> </u>	ļ			6/6 samples; source of uncertainty.
Total PAHs	890	1610	1684	4000	No		Detection limit less than criteria.
VOCs ug/kg		L	<b> </b>	ļ			
1,1,1-Trichloroethane	41		<u> </u>		No	<b></b>	No criteria available to evaluate detection limit.
1,1,2,2-Tetrachloroethane	41	1	1		No		No criteria available to evaluate detection limit.

Comparison of Detection Limits to Sediment Quality Guidelines Dead Creek Segment F and Borrow Pit Lake Shallow Sediment Sauget Area I

	Maximum	Sediment			[ <u> </u>		<del>-  </del>
•	Detection	Quality	Florida	Ontario	A COPC for		ì
	Limit	Guidelines <sup>1</sup>	SQAG <sup>2</sup>	Guidelines <sup>3</sup>	this		
Compounds	or Range	TEC	TEL	LEL	Medium?	Why was this a COPC?	Comment on detection limits.
1,1,2-Trichloroethane	41				No		No criteria available to evaluate detection limit.
1,1-Dichloroethane	41				No		No criteria available to evaluate detection limit.
1,1-Dichloroethene	38				No		No criteria available to evaluate detection limit.
1,2-Dichloroethane	41	l			No		No criteria available to evaluate detection limit.
1,2-Dichloropropane	41				No		No criteria available to evaluate detection limit.
2-Butanone (MEK)	200				No		No criteria available to evaluate detection limit.
2-Hexanone	200	<u> </u>			No		No criteria available to evaluate detection limit.
4-Methyl-2-pentanone (MIBK)	200	1			No		No criteria available to evaluate detection limit.
Acetone	410				No		No criteria available to evaluate detection limit.
Benzene	41				No		No criteria available to evaluate detection limit.
Bromodichloromethane	41				No		No criteria available to evaluate detection limit.
Bromoform	41				No		No criteria available to evaluate detection limit.
Bromomethane (Methyl bromide)	82				No		No criteria available to evaluate detection limit.
Carbon disulfide	41				No		No criteria available to evaluate detection limit.
Carbon tetrachloride	41				No		No criteria available to evaluate detection limit.
Chlorobenzene	41				No		No criteria available to evaluate detection limit.
Chloroethane	82				No		No criteria available to evaluate detection limit.
Chloroform	41				No	_	No criteria available to evaluate detection limit.
Chloromethane	82				No		No criteria available to evaluate detection limit.
cis-1,3-Dichloropropene	33				No		No criteria available to evaluate detection limit.
Cis/Trans-1,2-Dichloroethene	41				No		No criteria available to evaluate detection limit.
Dibromochloromethane	41				No		No criteria available to evaluate detection limit.
Ethylbenzene	41				Yes	No criteria; ND in background	No criteria available to evaluate detection limit.
Methylene chloride (Dichloromethane)	41				No		No criteria available to evaluate detection limit.
Styrene	41				No		No criteria available to evaluate detection limit.
Tetrachloroethene	41				No		No criteria available to evaluate detection limit.
Toluene	41				No		No criteria available to evaluate detection limit.
trans-1,3-Dichloropropene	33				No		No criteria available to evaluate detection limit.
Trichloroethene	41				No		No criteria available to evaluate detection limit.
Vinyl chloride	82				No		No criteria available to evaluate detection limit.
Xylenes, Total	41				No		No criteria available to evaluate detection limit.
Dioxin TEQ (mammal) pg/g	NA				Yes	Greater than reference area.	NA :

Notes: Except where noted, concentrations in ug/kg for organic constituens; mg/kg for inorganic constituents.

NA = Not applicable; ND = No detected

NEL = No-Effect Level

<sup>&</sup>lt;sup>1</sup> Threshold Effects Concentration - MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Arch. Environ. Contam. Toxicol.* 39:20-31.

<sup>&</sup>lt;sup>2</sup> Sediment Quality Assessment Guidelines - MacDonald Environmental Sciences, Ltd. 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volume 1— Development and Evaluation of Sediment Quality Assessment Guidelines. Prepared for FLDEP. November, 1994.

<sup>&</sup>lt;sup>3</sup> Lowest Effects Level - Persaud, D., R. Jaagumagi, and A. Hayton. 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Ontario Ministry of Environment and Energy. August 1993.

<sup>\*</sup> Ontario and Sediment Quality Guideline values are for 2,4'-DDT and 4,4'-DDT combined

<sup>\*\*</sup> Florida, Ontario, and Sediment Quality Guideline values are for Chlordane Bold indicates detection limit exceeds screening benchmark.

### Comparison of Detection Limits to Sediment Quality Guidelines Dead Creek Segment F Combined Shallow and "Industry Specific" Sediment Samples Sauget Area I

	Maximum Detection Limit	Sediment Quality Guidelines <sup>1</sup>	Florida SQAG <sup>2</sup>	Ontario Guidelines <sup>3</sup>	A COPC for		
Compounds <sup>4</sup>	or Range	TEC	TEL	LEL	1	Why was this a COPC?	Comment on detection limits.
Metals (mg/kg)							
Copper	All Detected	31.6	18.7	16	Yes	Greater than criteria	Detected in all samples.
Zinc	All Detected	121	124	120	Yes	Greater than criteria	Detected in all samples.
Total Organic Carbon (mg/kg dry weight)	All Detected		I		No	NA	NA
PCBs (ug/kg)	Ī				ŀ		
Decachlorobiphenyl	24-310		Ī		No	I	No criteria available to evaluate detection limit.
Dichlorobiphenyl	4.8-61		Ţ	Ī	No	I	No criteria available to evaluate detection limit.
Heptachlorobiphenyl	15-180			j	No		No criteria available to evaluate detection limit.
Hexachlorobiphenyl	9.8-120		1	1	No		No criteria available to evaluate detection limit.
Monochlorobiphenyl	4.8-61			[	No		No criteria available to evaluate detection limit.
Nonachlorobiphenyl	24-310			l	No		No criteria available to evaluate detection timit.
Octachlorobiphenyl	15-180	ŀ	<u> </u>		No		No criteria available to evaluate detection limit.
Pentachlorobiphenyl	9.8-120			1	No		No criteria available to evaluate detection limit.
Tetrachloroblphenyl	9.8-120	Į .		İ	No		No criteria available to evaluate detection limit.
Trichlorobiphenyl	4.8-61		1		No	1	No criteria available to evaluate detection limit.
Total PCBs	24-310	59.8	21.6	70	Yes	Greater than criteria	Detection limit greater than criteria (TEL) in 2/19 samples; slight source of uncertainty.

Notes: Except where noted, concentrations in ug/kg for organic constituens; mg/kg for inorganic constituents.

<sup>&</sup>lt;sup>1</sup> Threshold Effects Concentration - MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Arch. Environ. Contam. Toxicol.* 39:20-31.

<sup>&</sup>lt;sup>2</sup> Sediment Quality Assessment Guidelines - MacDonald Environmental Sciences, Ltd. 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volume 1-- Development and Evaluation of Sediment Quality Assessment Guidelines. Prepared for FLDEP. November, 1994.

<sup>&</sup>lt;sup>3</sup> Lowest Effects Level - Persaud, D., R. Jaagumagi, and A. Hayton. 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Ontario Ministry of Environment and Energy. August 1993.

<sup>&</sup>lt;sup>4</sup> Evaluation for remaining analytes is the same as for shallow sediments (industry specific sediment samples were analyzed for copper, zinc, TPH, TOC, and PCBs) Bold indicates detection limit exceeds screening benchmark.

#### Comparison of Detection Limits to Sediment Quality Guidelines Borrow Pit Lake "Industry Specific" Sediment Samples Sauget Area I

	Maximum	Sediment					
	Detection	Quality	Florida	Ontario	A COPC for		
	Limit	Guidelines <sup>1</sup>	SQAG2	Guidelines <sup>3</sup>	this		
Compounds <sup>4</sup>	or Range	TEC_	TEL	LEL	Medium?	Why was this a COPC?	Comment on detection limits.
Metals (mg/kg)							
Copper	All Detected	31.6	18.7	16	Yes	Greater than criteria	Detected in all samples.
Zinc	All Detected	121	124	120	Yes	Greater than criteria	Detected in all samples.
Total Organic Carbon (mg/kg dry weight)	All Detected				No	NA	NA
PCBs (ug/kg)							
Decachlorobiphenyl	20-450				No		No criteria available to evaluate detection limit.
Dichlorobiphenyl	3.9-89				No		No criteria available to evaluate detection limit.
Heptachlorobiphenyl	12-270				No		No criteria available to evaluate detection limit.
Hexachlorobiphenyl	7.9-180				No		No criteria available to evaluate detection limit.
Monochlorobiphenyl	3.9-89				No		No criteria available to evaluate detection limit.
Nonachlorobiphenyl	20-140				No		No criteria available to evaluate detection limit.
Octachlorobiphenyl	12-270		ļ		No		No criteria available to evaluate detection limit.
Pentachlorobiphenyl	7.9-57				No		No criteria available to evaluate detection limit.
Tetrachlorobiphenyl	7.9-180		ļ		No		No criteria available to evaluate detection limit.
Trichlorobiphenyl	3.9-89				No		No criteria available to evaluate detection limit.
Total PCBs	20-140	59.8	21.6	70	Yes	Greater than criteria	Detection limit slightly greater than criteria (TEL)
			<u> </u>		ļ		in20/24 samples; slight source of uncertainty.
1	}		[		ļ	1	

Notes: Except where noted, concentrations in ug/kg for organic constituents; mg/kg for inorganic constituents.

<sup>&</sup>lt;sup>1</sup> Threshold Effects Concentration - MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Arch. Environ. Contam. Toxicol.* 39:20-31.

<sup>&</sup>lt;sup>2</sup> Sediment Quality Assessment Guidelines - MacDonald Environmental Sciences, Ltd. 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volume 1-- Development and Evaluation of Sediment Quality Assessment Guidelines. Prepared for FLDEP. November, 1994.

<sup>&</sup>lt;sup>3</sup> Lowest Effects Level - Persaud, D., R. Jaagumagi, and A. Hayton. 1993. Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario. Ontario Ministry of Environment and Energy. August 1993.

<sup>&</sup>lt;sup>4</sup> Evaluation for remaining analytes is the same as for shallow sediments (Industry specific sediment samples were analyzed for copper, zinc, TPH, TOC, and PCBs) Bold indicates detection limit exceeds screening benchmark.



### Summary Statistics for Borrow Pit Lake Largemouth Bass Sauget Area I

	T	Γ	Т		· · · · · · · · · · · · · · · · · · ·	
	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/kg 2,4,5-T	3		0%			5.00
2,4,5-TP (Silvex)	3		0%			5.00
2,4-D	3		0%			5.00
2,4-DB	3		0%			5.00
Dalapon   Dicamba	3	1	0% 33%	1.9	1.9	1000 5.63
Dichloroprop	3	'	0%	1.3	1.5	50
Dinoseb	3		0%			50
MCPA[(4-chloro-2-methylphenoxy)-acetic a	3 3	1	33% 0%	1800	1800	1267 1000
MCPP[2-(4-chloro-2-methylphenoxy)-propan Pentachlorophenol	3		0%			6.67
Metals, mg/kg						
Aluminum	3	2	67%	19	33	20
Antimony Arsenic	3 3		0% 0%			0.09 3.17
Beryllium	3		0%			0.47
Cadmium	3		0%			0.23
Chromium	3	3	100%	0.45	0.93	0.64
Copper Copper	3	3	100%	0.41	0.68	0.54
Cyanide, Total Lead	3 3		0% 0%			5 0.23
Mercury	3	2	67%	0.057	0.064	0.04
Nickel	3		0%			4.70
Selenium	3	2	67%	0.6	0.63	0.49
Silver Zinc	3 3	3	0% 100%	15	19	0.05 17
			1			
% Lipid	3	3	100%	1.5	1.8	1.60
PCB, ug/kg Decachlorobiphenyl	3		0%			25
Dichlorobiphenyl	3 (	1	0%			5.00
Heptachlorobiphenyl	3	2	67%	16	21	17
Hexachlorobiphenyl	3	3	100%	44	150	105
Monochlorobiphenyl Nonachlorobiphenyl	3		0%) 0%	l		5.00 25
Octachlorobiphenyl	3	1	0%			15
Pentachlorobiphenyl	3	3	100%	30	130	90
Tetrachlorobiphenyl	3	2	67%	19	46	25
Trichlorobiphenyl	3		0%			5.00
Total PCBs	3	3	100%	99	320	237
Pesticides, ug/kg 4.4'-DDD	3		0%			6.50
4,4'-DDE	3 1	2	67%	15	21	14
4,4'-DDT	3	ľ	0%			6.50
Total DDT	3	2	67%	15	21	14
Aldrin Alpha Chlordane	3 3	Í	0% 0%	(		3.40 3.40
alpha-BHC	3		0%			3.40
beta-BHC	3	ľ	0%	1		3.40
lelta-BHC	3	ŀ	0%			3.40
Dieldrin Endosulfan I	3		0%  0%	- {		6.50 3.40
Endosulfan II	3	j	0%			6.50
Endosulfan sulfate	3 }	}	0%)	)		6.50
ndrin	3	[	0%			6.50
Indrin aldehyde Indrin ketorie	3 3	ì	0%  0%	ļ		6.50 6.50
Samma Chiordane	3	2	67%	15	19	12
gamma-BHC (Lindane)	3	-	0%			3.40
leptachlor	3	1	33%	1.5	1.5	2.77
leptachlor epoxide	3 3		0%			3.40
Methoxychlor Toxaphene	3	ł	0%) 0%(	-		34 340
SVOCs, ug/kg						
,2,4-Trichlorobenzene	3	1	0%	ļ		85
,2-Dichlorobenzene	3		0%	j		85
,3-Dichlorobenzene ,4-Dichlorobenzene	3 3	ļ	0% 0%			85 85
2,2'-Oxybis(1-chloropropane)[bis(2-Chlor	3	Í	0%	{		85
2,4,5-Trichlorophenol	3	ì	0%	ļ		210
,4,8-Trichlorophenol	3	1	0%			85
2,4-Dichlorophenol	3 3	j	0%			85 85
2,4-Dimethylphenol 2,4-Dinktrophenol	3	Ì	0%  0%			85 210
2,4-Dinitrotoluene	3	)	0%			85
,6-Dinitrotoluene	3	ļ	0%	j		85
-Chloronaphthalene	3	ļ	0%			85
-Chlorophenol -Methyl-4,6-dinitrophenol	3	j	0% 0%			85 210
:-Metryn-4,6-diniuophienoi :-Methylnaphthalene	3	ſ	0%	(	[	85

### Summary Statistics for Borrow Prt Lake Largemouth Bass Sauget Area i

Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
- Muthylphenal (o-cresol)	Analyzed 3	Democrato	0%	Uetecas		85
Miroanline	3		0%			210
Mirophenol	3		0%			85
18.4 Methylphenol (m8.p-cresol)	3		0% 0%			85 85
3.5-Dichlorobenzidine Mitroaniline	3		0%			210
l-Bromophenylphenyl ether	3		0%			85
-Chioro-3-methylphenol	3		0%			85
I-Chioroenline	3		0%			85
I-Chiorophenylphenyl ether	3		0%			210
I-Nitrosniine I-Nitrophenol	3		0%			210
Acenephthene	3		0%			8
licensphthylene	3		0%			85
Auguscieus	3		0%			8
denzo(a)enthracene	3		0% 0%			85 85
Berzo(a)pyrene Berzo(b)fluoranthene	3		0%			8
Berezo(g.ft.)perylene	3		0%			8
Sengo(k)Augranithene	3		0%			8
ns(2-Chlorosthoxy)methane	3		0%			8
rs(2-Charoshyl)sher	3	j	0% 0%	J		8 90
re(2-Ethythisyl)phthelate Adylbenzylphthelate	3		0%			8
arbazole	3		0%			8:
Drysene	3		0%			8
h-n-butylphthalate	3	1	33%	32	32	6
h-n-octylphthelate	3		0% 0%			8
Aberzo(a,h)entracene Aberzoturan	3		0%			8
Aginylphihalate	3 /	1	0%			ă
emptry/chthulate	3		0%			8
Vorantiene	3		0%			8
Norme legationsbergere	3		0% 0%			8
inactionbutations	3	ľ	0%	!		8:
leuachtorocyclopentadiene	3		0%			8:
lexactionethene	3		0%			85
rdeno(1,2,3-cd)pyrene	3	ł	0%			8
ophorone	3	ŀ	0%			85
Nitrosodi-n-propytemne -Nitrosodiphenylamine/Diphenylamine	3 3	İ	0% 0%			8
aphthelene	3	!	0%			8
leobenzene	3 [	1	0%			8
entachtorophenol	3		0%			210
terentivere	3		0%			85
hend yeare	3	ł	0% 0%			85
	- 1		· -			
etal PANs lacins and Furans, up/kg	3		0%			
23.48.7.8.9-OCDO	3	- 1	0%			6.53E-03
2348789-OCOF	3		0%			1.05E-0
2.3.4.6.7.8-HpC00	3		0%			8.67E-0
2.3.4.8.7.8-HpCDF	3		0%			1.00E-0
2.3.4.7.8.9-HpCOF	3		0%			1.67E-0
2,3,4,7,8-HsC00 2,3,4,7,8-HsC0F	3	1	0% 33%	4.80E-04	4.80E-04	1.50E-0 2.43E-0
2.3.6.7.8-HiCOO	3	1	33%	5 40E-04	5.40E-04	2.93E-0
2367.8HECOF	3	<u>i</u> ]	33%	2.30E-04	2.30E-04	1.43E-0
2,3,7,8,9+tsC00	3		0%			1.33E-0
2.3.7.8.9 His COF	3		0%			1.00E-0
2.3.7.6-PeCOO	3	1	33%	8.10E-04	8.10E-04	5.02E-0
2,3,7,8-PeCOF 3,4,6,7,8-HeCOF	3	1	33% 33%	1.10E-03 3.80E-04	1.10E-03	3.97E-0
147.8-PeCOF	3	2	53% 67%	7.10E-04	3.80E-04 9.70E-04	2.10E-0 6.63E-0
17 J-TCDC	3	2	67%	7.50E-04	9.00E-04	7,33E-0
17,8-TCDF	3	3	100%	8.10E-03	1.14E-02	9.27E-0
eal HpCOO	3	2	67%	1.40E-03	2.00E-03	1.43E-0
eal HpCOF	3	1]	33%	6.70E-03	6.70E-03	4.37E-0
tal HsC00	3 3	1	33%	5.40E-04	5.40E-04	4.80E-0
			0%			1.68E-0
		. 1		8 40C A4	9 40E A-	e
sel HuCOF	3 [	1	33%	8.10E-04	8.10E-04	5.02E-0
		1		8.10E-04 7.50E-04	8.10E-04 7.50E-04	5.02E-0 1.91E-0 5.83E-0

Note: One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Reference Area Largemouth Bass Data Sauget Area I

	1	1	<del></del>		<del> </del> -	<del></del>
	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/kg 2.4.5-T	4	ł	0%			5.00
2,4,5-TP (Silvex)	4		0%			5.00
2,4-D	1 4		0%			5.00
2,4-DB	1 4	1	0%			5.00
Dalapon	4		0%			1000
Dicamba	4	ļ	0%			10
Dichloroprop Dinoseb	1		0%			50 50
MCPA((4-chloro-2-methylphenoxy)-acetic a	4		0%			1000
MCPP[2-(4-chloro-2-methylphenoxy)-propan	4		0%			1000
Pentachlorophenol	4		0%			6.25
Metals, mg/kg						
Aluminum	4	4	100%	22.00	81.00	41
Antimony Arsenic	4		0% 0%			0.09 2.10
Beryllium	4		0%		'	0.48
Cadmium	4		0%			0.23
Chromium	4	4	100%	0.19	0.36	0.28
Copper	4	4	100%	0.36	0.84	0.52
Cyanide, Total	4		0%			5.00
Lead	4		0%	0.40		0.23
Mercury Nickel	4	4	100% 0%	0.10	0.14	0.11 4.56
Selenium	4	3	75%	0.53	0.86	4.56 0.60
Silver	4		0%	5.55	0.00	0.05
Zinc	4	4	100%	8.50	15.00	11
A/ 11-12-	_ [		4000	0.00	0.40	4.0
% Lipid PCBs and Pesticides, ug/kg	4	4	100%	0.66	2.40	1.19
Decachlorobiphenyl	4		0%			25
Dichlorobiphenyl	4		0%	J		5.00
Heptachlorobiphenyl	4		0%	į		15
Hexachlorobiphenyl	4	1	25%	9.30	9.30	9.83
Monochlorobiphenyl	4		0%			5.00
Nonachlorobiphenyl	4		0%			25
Octachlorobiphenyl Pentachlorobiphenyl	4	1	0% 25%	9.50	9.50	15 9.88
Tetrachiorobiphenyl	41	' '	0%	8.50	9.50	10
Trichlorobiphenyl	4		0%			5.00
4,4'-DDD	4	i	0%	ł		5.54
4,4'-DDE	4	4	100%	3.50	6.60	5.30
4,4'-DDT	4		0%			5.54
Aldrin Alpha Chlordane	4	ſ	0% 0%	ſ		2.89 2.89
alpha-BHC	71	- 1	0%	- 1		2.89
beta-BHC	4		0%			2.89
delta-BHC	4		0%			2.89
Dieldrin	4	2	50%	5.30	5.60	5.01
Endosulfan I	4		0%[			2.89
Endosulfan II	- 11		0%			5.54 5.54
Endosulfan sulfate Endrin	4		0%  0%			5.54 5.54
Endrin aldehyde	4		0%	1		5.54
Endrin ketone	4	J	0%	ļ		5.54
Gamma Chlordane	4 [		0%			2.89
gamma-BHC (Lindane)	4		0%			2.89
Heptachlor	4	1	0%			2.89
Heptachlor epoxide	4		0% 0%			2.89
Methoxychlor Toxaphene	4		0%	ļ		29 289
SVOCs, ug/kg			- 0,0			208
1,2,4-Trichlorobenzene	4	1	0%	i		85
1,2-Dichlorobenzene	4		0%			85
1,3-Dichlorobenzene	4		0%			85
1,4-Dichlorobenzene	4 ]	ļ	0%			85
2,2'-Oxybis(1-chloropropane)[bis(2-Chlor	4	Ì	0%	į		85
2,4,5-Trichlorophenol 2,4,6-Trichlorophenol	4 4		0% 0%			210 85
2,4-Dichlorophenol	4		0%			85
2,4-Dimethylphenol	41		0%			85
2,4-Dinitrophenol	4	ſ	0%			210
2,4-Dinitrotoluene	4		0%			85
2,6-Dinitrotoluene	4		0%			85
2-Chloronaphthalene	4	ļ	0%	ļ		85
2-Chlorophenol	4		0%[			85
2-Methyl-4,6-dinitrophenol	4	j	0% 0%	]		210
2-Methylnaphthalene 2-Methylphenol (o-cresol)	4		0%			85 85
2-Metry/prenor (o-cresor)	4	1	0%	}		210
2-Nitrophenol	41	ļ	0%	1		85

### Reference Area Largemouth Bass Data Sauget Area I

	Number	Number	Frequency of	Michel	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
3&4-Methylphenal (m&p-cresal) 3,3-Dichlarabenzidine	1		0% 0%		ł i	8. 8.
3.46boenine			0%		i	210
4-Bromophenylphenyl ether			0%			8
4-Chioro-3-methylphenol			0%			a s
4-Chlorosniline	1 4		0%			8
4-Chiorophenylphenyl ether	4		0%			8
4-Nitroaniine	1 4		0%			210
4-Nitrophenol	1 4		0%			210
Acenaphthene	4		0%			8.
Acenephthylene	1 4		0%		İ	85
Anthracene	4		0%			8.
Benzo(a)enthracene	] 4		0%			85
Benzo(a)pyrene	4		0%			85
Benzo(b)fluoranthene	] 4]		0%			8.
Benzo(g.)u)perylene	4		0%			8.5
Benzo(k)fluoranthene	1 4		0%			85
be(2-Chloroethoxy)methene	1 4		0%			8.
bs(2-Chloroethyl)ether	4		0%			80
ba(2-Ethythexyl)phthalate	4		0%			8:
Butylbenzylphtholiate	1 4		0%			86
Carbazole	4 4		0%			8
Chrysene	4	_	0%			8:
O-n-butylphthalate	4	2	50%	19.00	20.00	5
Di-m-octylphthalate	1 7		0%			8:
Aberzo(a,h)entivacene	4		0%			8
Oberzoluran	4		0%			8
hadhylphthalate	4		0% 0%			8
Demothylphthalate	1 1		0%			8 8:
Tuoranthene Tuorane	1		0%			8:
incertioroberizane			0%			8.
texactions but advise			0%			8
*exactiorocyclopentadiene	1		0%			85
texachiorosthene			0%			85
ndeno(1,2,3-cd)pyrene	[ ]		0%			8
sophorone	1		0%			85
Mitrosod-n-propytamine	4		0%			8:
l-Nitroeodiphenylamine/Diphenylamine	1		0%			
aphthelene	4		0%			8
Brobercene	4		0%		i i	8
ersactiorophenol	4		0%	l		210
henerdhrene	4		0%	l		8:
hend	4	i	0%	i		8:
) rene	4		0%			8:
			I			
otal PAHs						
toutes and Furanc, ug/tig	.	ا ,	اسما	ا محمد		
2346789-0000	4	4	100%	5.50E-03	1.23E-02	9.73E-0
2346789-0CDF 234678-HpCDD	4		0%			5.38E-0
234878-HpCDF	1	ſ	0%	ſ	ĺ	4.25E-0
2.3.4.7.8.9.HpCOF	4		0%		İ	2.38E-0 3.88E-0
2.3.4.7.8-HiCOO	1		0%			2.88E-0
2.3.4.7.6.HACTIS				9.405.04	1 105 00	7 955 0
2.3.6.7.8-H±COO		3	75%	0.405-04	1.102-03	7.63E-U
Control of the contro	7	1	0% 0%			2.38E-0
2,3,6,7,8-HiCOF 2,3,7,8,9-HiCOO	7				1	1.63E-0
	71	i	0%	ſ	ĺ	3.13E-0
2.3.7.8.9.HbCOF		1	0%			2.38E-0
2.3.7.8-PeCOO		1	0%		- 1	3.25E-0
2.3.7.8-PeCOF			0%			1.88E-0
3.4.6.7.8-th-COF			0%			2.00E-0
3.4.7.8-PeCDF	4		0%	ì	1	1.88E-0
3.7.4-TCD0	4	_	0%			2.25E-0
3.7.8-TCDF	4	1	25%	1.60E-03	1.60E-03	5.38E-0
жы нуссоо	4		0%	]		4.25E-0
sed HpCOF	4		0%			1.86E-0
otal HuCOO	4	ļ	0%		ļ	2.88E-0
otal HuCOF	4		0%		1	9.61E-0
otal PeCOO	4		0%	i		3.25E-0
PeCOF	4		0%			1.61E-0
ned TCDD	4	i	0% 0%	- 1	1	2.25E-0 1.96E-0

Note:
One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Brown Bullhead Data Summary for Borrow Pit Lake Sauget Area I

<u> </u>	Γ	<u></u>			J	J
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Herbicides, ug/kg						
2,4,5-T	3		0%			5.00
2,4,5-TP (Silvex)	3	}	0%		1	5.00
2,4-D	3		0%			5.00
2,4-DB	3		0%			5.00
Dalapon	3		0%			1000
Dichloroprop	3	1	0% 33%	6.6	6.6	8.33
Dinoseb	3 3 1	' '	0%	0.0	0.0	36 50
MCPA((4-chioro-2-methylphenoxy)-acetic a	3		0%			1000
MCPP(2-(4-chloro-2-methylphenoxy)-propan	. 3		0%			1000
Pentachlorophenol	3		0%			1000
Metals, mg/kg			- 0,78			
Aluminum	. з	3	100%	7.7	18	13
Antimony	3 (	-	0%[			0.09
Arsenic	3		0%			1.43
Beryllium	3		0%			0.47
Cadmium	3		0%			0.23
Chromium	3	3	100%	0.27	0.70	0.42
Copper	3 (	3	100%	0.79	0.89	0.84
Cyanide, Total	3		0%			5.00
Lead	3 ]	1	33%	0.25	0.25	0.24
Mercury	3	3	100%	0.05	0.26	0,13
Nickel	3		0%			4.70
Selenium	3 }		0%	ļ		0.23
Silver	3		0%			0.05
Zinc	3	3	100%	18	22	20
	Ì					
% Lipids	3	3	100%	0.30	1.70	1.13
PCB, ug/kg	اما		201			
Decachlorobiphenyl	3	(	0%	ĺ	ĺ	25
Dichlorobiphenyl	3	i	0%			5.00
leptachlorobiphenyl	3		0%	امه		15
lexachlorobiphenyl	3	2	67%	43	52	35
Monochlorobiphenyl Nonachlorobiphenyl	3	İ	0%	1		5.00
Octachlorobiphenyl	3 3	- 1	0% 0%	· i		25 15
Pentachlorobiphenyl	3	2	67%	33	52	32
etrachlorobiphenyl	3	-	0%	~	32	10
richlorobiphenyl	3		0%		ĺ	5.00
					ابمد	
Total PCBs	3	2	67%	76	104	63
esticides, ug/kg .4'-DDD	3		0%			8.67
,4-000 ,4-00E	3	3	100%	3.4	29	18
,4-0DT	3	31	0%	3.7	20	8.67
otal DDT	3	3	100%	3	29	18
Vidrin	3	٠,	0%	۲	-~	4.60
Joha Chlordane	3	1	33%	12	12	7.47
Ipha-BHC	3	,	0%	`~	,-	4.60
eta-BHC	3	i	0%	ł		4.60
elta-BHC	3		0%			4.60
Dieldrin	3	ŀ	0%			8.67
ndosulfan I	3		0%	i	{	4.60
ndosulfan II	3		0%		1	8.67
ndosulfan sulfate	3		0%	1		8.67
ndrin	3		0%			8.67
ndrin aldehyde	3	j	0%		ŀ	8.67
ndrin ketone	3	- 1	0%	J		8.67
amma Chlordane	3	1	33%	11	11	7.13
amma-BHC (Lindane)	3		0%			4.60
eptachlor	3 (	1 [	33%	2.8	2.8	3.20
eptachlor epoxide	3		0%		1	4.60
lethoxychlor	3		0%	)		46
oxaphene	3		0%			347
VOCs, ug/kg	ام		201			
2,4-Trichlorobenzene	3		0%		1	85
2-Dichlorobenzene 3-Dichlorobenzene	3		0%			85
	3		0%		1	85
	3	1	0%  0%		j	85 85
4-Dichlorobenzene		i	0%	ļ		
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor				1		210
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol	3	}		J		
4-Dichlorobenzene 2-Oxybls(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4,6-Trichlorophenol	3 3		0%		{	
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4,6-Trichlorophenol 4-Dichlorophenol	3 3 3		0% 0%	j		85
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4-6-Trichlorophenol 4-Dichlorophenol 4-Dimethylphenol	3 3 3 3		0% 0% 0%			85 85
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4,6-Trichlorophenol 4-Dichlorophenol 4-Dimethylphenol 4-Dinitrophenol	3 3 3 3		0% 0% 0% 0%	:		85 85 210
4-Dichlorobenzene 2-Oxybls(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4,6-Trichlorophenol 4-Dichlorophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol	3 3 3 3 3		0% 0% 0% 0% 0%			85 85 210 85
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4,6-Trichlorophenol 4-Dichlorophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene	3 3 3 3 3		0% 0% 0% 0% 0%			85 85 85 210 85
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4-Dichlorophenol 4-Dichlorophenol 4-Dimethylphenol 4-Dinitrophenol 4-Dinitrotoluene 6-Diritrotoluene 6-Diritrotoluene 6-Diritrotoluene	3 3 3 3 3 3 3		0% 0% 0% 0% 0% 0%			85 85 210 85 85 85
4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4,6-Trichlorophenol 4-Dichlorophenol 4-Dintrophenol 4-Dintrophenol 4-Dintrophenol 6-Dintrotoluene 6-Dintrotoluene	3 3 3 3 3		0% 0% 0% 0% 0%			85 85 210 85

### Brown Bullhead Data Summary for Borrow Pit Lake Sauget Area I

	<del></del>	<u> </u>	]			<del></del>
0	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds 2-Methylphenol (o-cresol)	Analyzed 3	Detected	Detection 0%	Detected	Detected	Concentration 85
2-Mitrogniline	3		👸			210
2-Nitrophenol	3		0%			85
3&4-Muthylphenal (m&p-cresol)	] 3		0%			85
3.3'-Octiorobenzidine	3 3		0%			85 210
3-Nitroenline 4-Bromophenylphanyl ether	3		0%			85
4-Chicro-3-methylphenol	3		0%			a se
4-Chioroenline	] 3		0%			85
4-Chlorophenylphenyl ether	3	,	0%			8.5
4-Nikoanime 4-Nikoahanol	3 3		0% 0%			210 210
opranci Acenaphthane	3		0%			8
Aceregnatrylene	3		0%			85
Arthracene	3		0%			8.
Bertzo(a)er@vacere	3		0%	j		8
Berzo(a)pyrene	3 3		0% 0%	}		8
Berzo(b)fluoranthene Berzo(g.hu)perylene	3		0%	1		8
Berzo(k)fluoranthene	j 3		0%			8.
bs(2-Chlorosthoxy)methane	] 3		0%			8
bs(2-Criorosthyl)ether	] 3		0%			8
bio(2-Ethylhexyl)phthelate	] 3	1	33%	97	97	8
Butyfberzylphthatate Carbazole	3 3		0% 0%			8: 8:
Chrysene	3		0%			8:
Di-n-burylphthalate	3		0%			84
D-n-oczylphihalate	] 3		0%			85
Diperzo(a.h)anthracens	3		0%		ļ	85
Dibermiuran	3 3		33%	••	18	84 65
Destrykphshakate Desegtrykphshakate	3	1	3376°	18	16	8:
Puoranthene	ا م		0%			8:
Nome	3		0%			85
lexachlorobenzene	3		0%			85
texachtorobutacione	3		0%			85
lexactiorocyclopentadiene lexactiorosifiene	3		0% 0%			85 85
ndeno(1,2,3-cd)pyrene	ا قا		0%			85
sophorone	3		0%			85
Altrosod-n-propylamins	3		0%			85
4-Nitroeodiphenykamine/Diphenykamine	3		0% 0%			85 85
top/Mulane Novbergane	3		0%			127
Pertachtorophenol	3	- 1	0%			168
Transmittens	3		0%			85
hend	3	i	0%			85
years.	2	1	0%			85
otal PAHs	3		0%			85
Nocins and Furans, ug/kg 2346789-0000	3	3	100%	1 02E-02	1.15E-02	1,09E-02
2346789-OCDF	3	3	100%	6.55E-04	1.206-03	8.72E-04
23.48.7.8-HpC00	3	3	100%	1.50E-03	3.00E-03	2.23E-03
23.4.6.7.8-HpCDF	3	1	33%	5.45E-04	5.45E-04	3.82E-04
2.3.4.7.8.9-HpCDF	3		0%	_		3.08E-04
2,3,4,7,8+6c00	3	1	33%	1.80E-04	1.80E-04	2.60E-04
23.4.7.8-HiCOF 23.6.7.8-HiCOO	3	3	100% 100%	5.90E-04 7.80E-04	1.40E-03 2.40E-03	9.85E-04 1.53E-03
23678-HiCDF	3	3 : 1	33%	2.45E-04	2.40E-03 2.45E-04	1.53E-0
23789HiC00	3	•	0%	C		2.50E-0
23749HiCOF	3	1	33%	6.90E-04	6.90E-04	4.13E-0
2378-PeC00	3	3	100%	4.20E-04	1.10E-03	7.97E-0
23.7.8-PeCOF			0%		2	1.58E-0
	3	~		1.60E-04	3.20E-04	2.93E-0
3.4.6.7.8-HiCDF	3	2	67%	7 705.04	1 605.03	
	3	3	100%	7.70E-04 3.30E-04	1.60E-03 8.35E-04	
34878-HICOF 3478-PICOF	3			7.70E-04 3.30E-04 1.20E-03	1.60E-03 8.35E-04 4.00E-03	5.55E-0
34878-HiCDF 3478-PiCOF 378-TCDD 378-TCDF 378-TCDF	3 3 3 3	3 2 3 3	100% 67% 100% 100%	3.30E-04 1.20E-03 1.60E-03	8.35E-04	5.55E-0 2.83E-0
3.4.6.7.6.HuCDF 3.4.7.6.PuCDF 3.7.6.TCDD 3.7.6.TCDF 3.7.6.TCDF one HpCDD	3 3 3 3 3	3 2 3 3 3	100% 67% 100% 100% 100%	3.30E-04 1.20E-03 1.60E-03 2.00E-03	8.35E-04 4.00E-03 4.10E-03 3.00E-03	5.55E-0 2.83E-0 2.98E-0 2.52E-0
3.4.6.7.6.HuCDF 3.4.7.6.PuCDF 3.7.6.TCDD 3.7.6.TCDF 3.7.6.TCDF 0tal HpCDD 0tal HpCDD	3 3 3 3 3 3	3 2 3 3 3 3	100% 67% 100% 100% 100% 100%	3.30E-04 1.20E-03 1.60E-03 2.00E-03 1.80E-03	8.35E-04 4.00E-03 4.10E-03 3.00E-03 5.10E-03	5.55E-0 2.83E-0 2.98E-0 2.52E-0 3.92E-0
3.4.6.7.6-HsCDF 3.4.7.6-HsCDF 3.7.6-TCDD 3.7.6-TCDF 3.7.6-TCDF otal HpCDD otal HpCDD otal HsCDD	3 3 3 3 3	3 2 3 3 3 3	100% 67% 100% 100% 100% 100%	3.30E-04 1.20E-03 1.60E-03 2.00E-03 1.80E-03 7.80E-04	8.35E-04 4.00E-03 4.10E-03 3.00E-03 5.10E-03 2.40E-03	5.55E-0 2.83E-0 2.98E-0 2.52E-0 3.92E-0 1.58E-0
3.4.6.7.6-HisCDF 3.4.7.6-PisCDF 3.7.6-TCDD 3.7.6-TCDF 3.7.6-TCDF otal HisCDC otal HisCDC otal HisCDD otal HisCDD	3 3 3 3 3 3 3 3	3 2 3 3 3 3 3	100% 67% 100% 100% 100% 100% 100%	3.30E-04 1.20E-03 1.60E-03 2.00E-03 1.80E-03 7.80E-04 1.06E-02	8.35E-04 4.00E-03 4.10E-03 3.00E-03 5.10E-03 2.40E-03 3.80E-02	5.55E-04 2.83E-03 2.98E-03 2.52E-03 3.92E-03 1.58E-03 2.44E-03
3.4.6.7.6-HsiCDF 3.4.7.6-PsiCDF 3.7.6-TCDF 3.7.6-TCDF 3.7.6-TCDF otal HpCDO otal HpCDF otal HsiCDF otal HsiCDF otal PsiCDF	3 3 3 3 3 3 3	3 2 3 3 3 3 3 3	100% 67% 100% 100% 100% 100% 100%	3.30E-04 1.20E-03 1.60E-03 2.00E-03 1.80E-03 7.80E-04 1.06E-02 4.20E-04	8.35E-04 4.00E-03 4.10E-03 3.00E-03 5.10E-03 2.40E-03 3.80E-02 1.18E-03	5.55E-04 2.83E-03 2.98E-03 2.52E-03 3.92E-04 1.58E-03 2.44E-03 9.00E-04
3.4.6.7.6-HisCDF 3.4.7.6-PisCDF 3.7.6-TCDD 3.7.6-TCDF 3.7.6-TCDF otal HisCDC otal HisCDC otal HisCDD otal HisCDD	3 3 3 3 3 3 3 3	3 2 3 3 3 3 3	100% 67% 100% 100% 100% 100% 100%	3.30E-04 1.20E-03 1.60E-03 2.00E-03 1.80E-03 7.80E-04 1.06E-02	8.35E-04 4.00E-03 4.10E-03 3.00E-03 5.10E-03 2.40E-03 3.80E-02	1.31E-05 5.55E-04 2.83E-05 2.98E-05 3.92E-05 1.58E-05 2.44E-05 9.00E-04 3.68E-05 6.77E-04

Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Reference Area Brown Bullhead Summary Statistics Sauget Area I

		T				
	]	]	_ '			
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Herbicides, ug/kg	Autalyzeu	Detected	Detection	Detected	Detected	Concentiation
2,4,5-T	3	ĺ	0%	·		6.67
2,4,5-TP (Silvex)	3		0%			6.67
2,4-D	3	1	0%			6.67
2,4-DB	3	j	0%			6.67
Dalapon	3	ļ	0%			1333
Dicamba	3		0%			13
Dichloroprop	3	ŀ	0%			67
Dinoseb	3		0%			67
MCPAI(4-chloro-2-methylphenoxy)-acetic a	3	1	33%	8600	8600	3533
MCPP[2-(4-chloro-2-methylphenoxy)-propan	3	j .	0%	5555		1333
Pentachiorophenol	3		0%			13
Metals, mg/kg						<u></u>
Aluminum	3	3	100%	5,9	66	34
Antimony	3	_	0%	0.0	, <b>~</b>	0.0
Arsenic	3		0%			1.20
Beryllium	3	1	0%			0.46
Cadmium	3		0%		j	0.23
Chromium	3	3	100%	0.34	0.48	0.41
	3	. 3	100%	1.00		1.07
Copper	3	ا م		1.00	1.10	
Cyanide, Total			0%	0.40		5.00
-ead	3	2	67%	0.18	0.23	0.21
Mercury	3	3	100%	0.05	0.10	0.08
Nickel	3	_	0%	[	(	4.55
elenium	3	2	67%	0.48	0.50	0.40
Silver	3		0%	ł	1	0.05
linc	3	3	100%	16	24	20
4 Lipids	3	3	100%	1.00	1.40	1,13
CB, ug/kg	3		100%	1.00	1.40	1,13
	3		00/	ļ		•
Decachlorobiphenyl		1	0%	í		25
Dichlorobiphenyl	3	í	0%	- (	ľ	5.00
leptachlorobiphenyl	3		0%	i	1	15
lexachlorobiphenyl	3	ĺ	0%		ľ	10
lonochlorobiphenyl	3		0%			5.00
lonachlorobiphenyl	3 ]		0%	j	j	25
Octachlorobiphenyl	3		0%			15
Pentachlorobiphenyl	3	J	0%			10
Tetrachlorobiphenyl	3 (	ſ	0%	i	- {	10
richlorobiphenyl	3	Į.	0%			5.00
- A-I DOD-	ام	J	00/			•
Total PCBs	3		0%			
Pesticides, ug/kg		أم		4.6	_	
,4'-DDD	3	2	67%	1.2	2	5.33
,4'-DDE	3	3	100%	4.7	12	8.83
4'-DOT	3		0%	ì		8.67
Ndrin	3	_	0%	. [	_[	4.60
Ipha Chlordane	3 (	3 (	100%	1.1	2.5	1.57
pha-BHC	3		0%		1	4.60
eta-BHC	3	ŀ	0%			4.60
elta-BHC	3		0%		Į.	4.60
ieldrin	3	3	100%	1.7	3.8	2.77
ndosulfan i	3		0%		1	4.60
ndosulfan li	3 )	J	0%	j	1	6.67
ndosulfan sulfate	3	I	0%	1	ĺ	8.67
ndrin	3	1	33%	2.6	2.6	7.37
ndrin aldehyde	3 /	- 1			)	8.67
			0%1	(		
ndrin ketone i		1	0% 0%	[		
	3	2	0%	6 1	6.2	7.63
amma Chlordane	3 3	2	0% 67%	6.1 0.94	6.2 1.2	7.63 6.43
amma Chlordane amma-BHC (Lindane)	3 3 3	2 2	0% 67% 67%	6.1 0.94	6.2 1.2	7.63 6.43 3.05
amma Chlordane amma-BHC (Lindane) eptachlor	3 3 3 3		0% 67% 67% 0%			7.63 6.43 3.05 4.60
amma Chlordane imma-BHC (Lindane) aptachlor aptachlor epoxide	3 3 3 3		0% 67% 67% 0% 0%			7.63 6.43 3.05 4.60 4.60
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor	3 3 3 3 3		0% 67% 67% 0% 0%			7.63 6.43 3.05 4.60 4.60
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene	3 3 3 3		0% 67% 67% 0% 0%			7.63 6.43 3.05 4.60 4.60
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg	3 3 3 3 3 3		0% 67% 67% 0% 0% 0%			7.63 6.43 3.05 4.60 4.60 48
emma Chlordane emma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene	3 3 3 3 3 3		0% 67% 67% 0% 0% 0%			7.63 6.43 3.05 4.60 4.60 48 347
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene	3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0%			7.63 6.43 3.05 4.60 4.80 48 347
amma Chlordane  mma-BHC (Lindane)  aptachlor  aptachlor epoxide  ethoxychlor  oxaphene  VOCs, ug/kg  2-4-Trichlorobenzene  2-Dichlorobenzene  3-Dichlorobenzene	3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0%			7.63 6.43 3.05 4.60 4.60 46 347 85 85
amma Chlordane imma-BHC (Lindane) eptachlor ep	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0%			7.63 6.42 3.05 4.60 4.60 46 347 85 85
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0%			7.63 6.43 3.05 4.60 4.60 48 347 85 85 85
amma Chlordane mma-BHC (Lindane) eptachior eptachior epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0%			7.63 6.43 3.05 4.60 4.60 46 347 85 85 85 85
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0%			7.63 6.42 3.05 4.60 4.60 4.60 347 85 85 85 85
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.42 3.05 4.60 4.60 4.60 347 85 85 85 85
amma Chlordane amma-BHC (Lindane) eptachior eptachior eptachior epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 4-Dichlorobenzene 2-Oxybis(1-chloroprepane)[bis(2-Chlor 4,5-Trichlorophenol 4-Dichlorophenol 4-Dichlorophenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0%			7.63 6.44 3.05 4.60 4.60 46 347 85 85 85 85 85 85
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4-Dichlorophenol 4-Dichlorophenol 4-Dichlorophenol 4-Dimetrylphenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.4; 3.05 4.66 4.66 44 347 85 86 85 86 85 86 88
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorophenol 4-B-Trichlorophenol 4-Dichlorophenol 4-Dichlorophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.4; 3.09; 4.66 4.66 44; 34; 85; 85; 81; 82; 81; 82; 83; 84; 84; 84; 84; 84; 84; 84; 84; 84; 84
amma Chlordane mma-BHC (Lindane) eptachlor eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorophenol 4-Dichlorophenol 4-Dichlorophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrotoluene	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.44 3.05 4.64 4.64 347 85 85 85 85 86 86 86 86 86 87 88 81 88 81 81 82 81 82 83 84 84 84 84 85 86 86 86 86 86 86 86 86 86 86 86 86 86
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4-Dichlorophenol 4-Dichlorophenol 4-Dintrophenol 4-Dintrophenol 4-Dintrophenol 4-Dintrophenol 4-Dintrophenol 4-Dintrophenol 4-Dintrophenol 6-Dintrophenol 6-Dintrophenol 6-Dintrophenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.4; 3.0; 4.6( 4.6( 44; 34; 85 85 85 21( 85 85 21( 85 85 85 21( 85 85 85 85 85 86 86 86 86 86 86 86 86 86 86 86 86 86
amma Chlordane mma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 6-Trichlorophenol 4-Dichlorophenol 4-Dichlorophenol 4-Dimethylphenol 4-Dimethylphenol 4-Dinitrobluene 6-Dinitrobluene 6-Dinitrobluene 6-Dinitrobluene	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.4; 3.05 4.66 4.66 44 347 85 86 85 211 85 86 86 86 86 86 86 86 86 86 86 86 86 86
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorophenol 4-Dichlorophenol 4-Dinitrotoluene 6-Dinitrotoluene 6-Dinitrotoluene 6-Nioronaphthalene 6-Nioronaphthalene 6-Nioronaphthalene	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.45 3.05 4.66 4.66 46 347 85 85 85 210 85 85 85 85 85 85 85 85 85 85 85 85 85
amma Chlordane mma-BHC (Lindane) eptachlor eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorophenol 4-Dichlorophenol 4-Dinitrobenol 4-Dinitrobenol 4-Dinitrobenol 4-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol 6-Dinitrobenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.45 3.05 4.60 4.60 4.60 85 85 85 85 210 85 85 210 85 85 85 210
amma Chlordane amma-BHC (Lindane) eptachior eptachior epoxide lethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4,5-Trichlorophenol 4-Dirintophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene 6-Dinitrotoluene Chlorophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.43 3.05 4.60 4.60 4.60 4.60 85 85 85 85 85 85 85 85 85 85 85 85 85
amma Chlordane amma-BHC (Lindane) eptachlor eptachlor epoxide ethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 2-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol 4-Dirhorophenol 4-Dimethylphenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene 6-Dinitrotoluene 6-Chlorophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol Methyl-4,6-dinitrophenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%			7.63 6.43 3.05 4.60 4.60 4.60 4.60 4.60 4.60 4.60 4.60
ndrin ketone famma Chlordane amma BHC (Lindane) eptachior eptachior epoxide lethoxychlor oxaphene VOCs, ug/kg 2,4-Trichlorobenzene 2-Dichlorobenzene 3-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 4-Dichlorobenzene 6-Dichlorobenzene 1-Oxybis(1-chloropropane)[bis(2-Chlorobenzene) 1-Oxybis(1-chloropropane)[bis(2-Chlorobenzene) 1-Dirichlorophenol	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3		0% 67% 67% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%			

Appendix C-3 4 Reference Area Brown Bullhead Summary Statistics Sauget Area I

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Community	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds 384-Methylphenol (m&p-cresol)	Analyzed 3	Detected	Detection 0%	Detected	Detected	Concentration 85
3.3-Dichlorobenzidine	3	}	0%			85
3-Nitroeniine	3		0%			210
4-Bromophenylphenyl ether	3		0%			85 85
4-Chloro-3-methylphenol 4-Chloroeniine	3 3		0%			85
4-Chtorophenylphenyl ether	1 3	ĺ	0%			85
4-Niscentine	] 3		0%			210
4-Nitrophenol	3		0%			210
Acensphilhene Acensphilhylene	3 3		0%			85 85
Anthracene	1 3		0%			85
Benzo(a)enthracene	3		0%			85
Benzo(a)pyrene	3 3		0% 0%			85 85
Benzo(b)fluoranthene Benzo(g,hu)perylene	3		0%			85
Berzo(k)Buoranthene	3		0%			85
be(2-Chloroethoxy)methene	3		0%			85
be(2-Crioroety/)ether	3	_	0%	امر	,=	85
bie(2-Ethythexy1)phthatate Butytbercytotratate	3 3	2	67% 0%	46	47	59 85
Carbazzie	3		0%			85
Chrysene	j 3		0%			85
Di-n-bulyephilistatio	3		0%	ļ		85
Oi-n-octylphthelate Oiberzo(a,hjenthracene	3 3		0% 0%			85 85
Diberzokean	3		0%			85
Destryichthatate	3	1	33%	25	25	65
Ownethylphthalate	3		0%	ł		85
Ruprarthere Character	3		0% 0%			85 85
Fluorene Histochloroberzane	3		0%		İ	85
Herachtorobutadiene	3		0%			85
Herachtorocyclopentadiene	3		0%	ĺ	ĺ	85
Heractionethene	3 3		0% 0%			85 85
Indenc(1,2,3-cd)pyrene leaphorone	3		0%			85
n-Nileveod-n-propytamine	3		0%		İ	85
N-Nitroeodiphenylamine/Diphenylamine	] 3		0%		ļ	85
Naphthalene	3		0% 0%			85
Nitrobercene Pentachlorophenol	3 3		0%	Ì		127 168
Pharanthrane	ا قا	Ì	0%			85
Phenol	3		0%			85
Pyrane Yeard Balls	2		0%	!		85
Total PAHs Disaline and Fernies, ug/kg	<del>                                     </del>					
12346789-0000	3	3	100%	2.70E-03	2.00E-02	1.47E-02
1234A7A9-OCDF	3	2	67%	5.20E-04	1.60E-03	8.40E-04
1.2.3.4.6.7.8-HpC00	3	3	100%	8.10E-04	3.00E-03	1.87E-03
1,2,3,4,6,7,8,HpCOF 1,2,3,4,7,8,HpCOF	3		0%			1.67E-04 2.00E-04
12347.8-HiCOO	3		0%			1.67E-04
123478HbCDF	3	3	100%	2.60E-04	4.90E-04	4.10E-04
1.2.3.6.7.8-HiCOO	3	3	100%	3.90E-04	1.20E-03	7.37E-04
1,2,3,6,7,8 HisCOF 1,2,3,7,8,9 HisCOO	3	İ	0% 0%			1.17E-04 1.67E-04
12378946CDF	3		0%			1.33E-04
1,2,3,7,8-PeC00	3		0%			1.83E-04
12378-PeCOF	3		0%			1.17E-04
23.4,6,7, <del>8,16,</del> CDF 2.3,4,7,8-PeCDF	3	. [	0%	3 20E 04	2 20E 04	1.17E-04
2.3.7.8-TC00	3 3	1 2	33% 67%	3.30E-04 2.00E-04	3.30E-04 4.20E-04	1.77E-04 2.90E-04
2,3,7,8-TCOF	3	1 -	33%	7.50E-04	7.50E-04	3.17E-04
Total HpCDD	3	3	100%	8.10E-04	3.60E-03	3.43E-04
Total HpCDF	3	2	67%	1.30E-03	1.40E-03	9.33E-04
Total HiCOO Total HiCOF	3 3	3	100% 100%	3.90E-04 3.30E-03	1.20E-03 8.10E-03	7.37E-04 6.33E-03
Total PeCDD	3	3	100%	3.30E-03	o. 1UC-U3	0.33E-03 1.83E-04
Total PeCOF	3	3	100%	9.70E-03	1.83E-02	1.44E-02
Total TCDC	3	3	100%	2.00E-04	9.30E-04	6.47E-04
Total TCDF	3	3	100%	8.50E-03	2.53E-02	1.62E-02

Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Borrow Pit Lake Forage Fish Data Summary Sauget Area I

<u></u>	Τ		<del>,</del>		<del></del>	<del></del>
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Herbicides, ug/kg	7,					
2,4,5-T (ug/kg)	] 3		0%			6.67
2,4,5-TP (Silvex)	3		0%			6.67
2,4-D	3	_	0%			6.67
2,4-DB	3	2	67%	6.5	10	8.83
Dalapon Dicamba	3 3	1	0% 33%	2.6	2.6	1333 11
Dichloroprop	3	i	33%	6.7	6.7	52
Dinoseb	1 3	•	0%	0.7	0.7	67
MCPA[(4-chloro-2-methylphenoxy)-acetic a	3	2	67%	3100	3300	2800
MCPP[2-(4-chloro-2-methylphenoxy)-propan	3	_	0%			1333
Pentachlorophenol	[ 3 [	2 '	67%	1	2.2	7.73
Metals, mg/kg						
Aluminum	] 3 ]	3	100%	24	52	40
Antimony	3		0%			0.09
Arsenic	] 3		0%			1.33
Beryllium	3		0%			0.47
Cadmium Chromium	3 3	3	0% 100%	0.26	0.33	0.23 0.29
Copper	3	3	100%	0.26	0.32 1.7	0.29
Cyanide, Total	3	3	0%	0.5	1.6	5.00
Lead	3	1	33%	0.59	0.59	0.36
Mercury	3	2	67%	0.052	0.6	0.30
Nickel	3	- [	0%			4.70
Selenium	3	2	67%	0.53	0.54	0.44
Silver	3		0%			0.05
Zinc	3	3	100%	24	33	30
% Lipids	3	3	100%	1.5	1.8	1.63
PCB, ug/kg			10070			1.00
Decachlorobiphenyl	∖ 3 l	i	0%			42
Dichlorobiphenyl	3		0%	j		8.33
Heptachlorobiphenyl	3	l	0%	)		25
Hexachlorobiphenyl	3	2	67%	19	22	20
Monochlorobiphenyl	3		0%			8.33
Nonachlorobiphenyl	3	- 1	0%	}		42
Octachlorobiphenyl	3		0%			25
Pentachlorobiphenyl	3	1	33%	8.7	8.7	16
Tetrachlorobiphenyl	3	1	0%) 0%	ľ	ľ	17
Crichlorobiphenyl	3	ŀ	076		1	8.33
Total PCBs	3	2	67%	31	39	30
Pesticides, ug/kg	_					[
I,4'-DDD I,4'-DDE	3 3	3	0% 100%	4.1	10	8.8 7.73
i,4'-DDT	3	3	0%	4.1	ויי	7.73 8.83
Total DDT	3	3	100%	4.1	10	7.73
Aldrin	3	۱ ،	0%	7.''		4.47
Apha Chlordane	3	ì	0%	1	1	4.47
ipha-BHC	3	}	0%	· · · · · · · · · · · · · · · · · · ·		4.47
peta-BHC	3	ļ	0%	ŀ		4.47
lelta-BHC	3 ∫	ſ	0%	ĺ	- (	4.47
Dieldrin	3		0%	1		8.83
ndosulfan i	3	j	0%	i		4.47
ndosulfan II	3	1	0%	1	[	8.83
Endosulfan sulfate Endrin	3 3		0% 0%	1		8.83 8.83
ndrin aldehyde	3	- [	0%1	J	ſ	8.83
Indrin ketone	3		0%		l	8.83
Samma Chlordane	3	1	0%	1	ì	4.47
amma-BHC (Lindane)	3	ł	0%	}		4.47
leptachlor	3	ľ	0%	1		4.47
leptachlor epoxide	3	1	0%	}	i	4.47
Methoxychlor	3	ï	0%	i		45
oxaphene	3		0%			447
VOCs, ug/kg	_ ]	J	أبمم	J	]	
,2,4-Trichlorobenzene	3 (	1	0%(	- 1		142
,2-Dichlorobenzene	3		0%	1		142
,3-Dichlorobenzene .4-Dichlorobenzene	3	]	0%  0%	j		142 142
.2'-Oxybis(1-chloropropane)[bis(2-Chlor	3		0%	Ì		142
4,5-Trichiorophenol	3	ļ	0%	ŀ	]	350
4,8-Trichlorophenol	3	]	0%		Į.	142
4-Dichlorophenol	3		0%			142
4-Dimethylphenol	3		0%	ļ		142
,4-Dinitrophenoi	3	}	0%	}	)	350
4-Dinitrotoluene	3	İ	0%	1		142
6-Dinitrotoluene	3		0%	j	]	142
-Chloronaphthalene	3	i	0%		ł	142
-Chlorophenol	3	[	0%		]	142
-Methyl-4,6-dinitrophenol	3		0%	j		350
-Methylnaphthalene	3		0%			142

### Borrow Pit Lake Forage Fish Data Summary Sauget Area i

	Γ				_	<u> </u>
ĺ	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
2-Methylphenoi (o-cresol)	3		0%			142
2-Nitroenline 2-Nitrophenal	3		0% 0%			350 142
384-Methylphenol (m&p-cresol)	3		0%			142
3.3'-Dichlorobenzdine	3		0%			142
3-Narganline	] 3		0%			350
4-Bromopherylpheryl ether	3		0%			142
4-Charo-3-methylphenol 4-Charoemiline	3 3		0%			142 142
4-Chlorophenylphenyl ether	3		0%			142
4-Nitrogniine	3		0%			350
4-Narophenol	] 3		0%			350
Acerephthene	] 3		0%			142
Accreptifylere	3 3		0% 0%			142 142
Anthracene Benzo(a)enthracene	3		0%			142
Serzo(a)pyrene	ا ع		0%			142
Bergo(b)Augranthene	3		0%			142
Benzo(g.tu)perylene	3		0%			142
Berzo(k)fluoranthene	3		0%			142
bis(2-Chiorosthoxy)methene bis(2-Chiorosthyl)sther	3 3		0% 0%			142 142
big(2-Ethythaxyl)phthalate	3	2	67%	150	230	183
Buly theresylphitheliate	3	•	0%			142
Carbazole	3		0%			142
Chrysene	] 3	ł	0%			142
Di-n-butylphthelate Di-n-ochylphthelate	3 3	i	0% 0%			142 142
Diberzo(a.h)antivacene	3 1	1	33%	48	48	101
Dibenzoluran	3	· I	0%	- 1	-	142
Distrylphthatate	3	3	100%	19	37	31
Demailty/phthalate	3		0%			142
Pluoranhene Common	3		0%			142
Pluorene Hexachtorobenzene	3 3		0% 0%			142 142
Herachtorobutadiene	3		0%			142
Hexachlorocyclopentadiene	3	1	0%	}	Ì	142
Herachioroethere	3		0%			142
Indeno(1,2,3-cd)pyrene	3	1	33%	54	54	103
Isophorone n-Mitrosodi-n-propylamine	3	,	0%	]	ļ	142 142
N-Nitrosodiphenylamine/Diphenylamine	3	1	0%			142
Naphdialone	3	į.	0%			142
Mirobergane	3		0%	İ		142
Pertachlorophenol	3	ì	0%	Ì	l	350
Phananthrene Phanoi	3		0% 0%			142 142
Pyrane	š		0%			142
<u> </u>	1			***		
Total PAHs Dioxins and Furans, ug/kg	3	1	33%	102	102	357
12.34678.9-0C00	3	3	100%	8.90E-03	2.69E-02	1.99E-02
1.2.3.4.6.7.8.9-OCDF	3	2	67%	1.30E-03	4.40E-03	2.08E-03
1.2.3.4.6.7.8.HgCDO	3	3	100%	1.20E-03	1.80E-03	1.53E-03
234678HgCDF	3	!	33%	1.00E-03	1.00E-03	4.83E-04
1.2.3.4.7.8.9-HpCDF 1.2.3.4.7.8-HsCDD	3	1	33% 0%	5.80E-04	5.80E-04	4.43E-04
123478HiCDF	3	2	67%	4.10E-04	7.70E-04	2.00E-04 4.60E-04
2.3.6.7.8-HaC00	3 (	i [	33%	6 00E-04	6.00E-04	3.50E-04
1.2.3.8.7.8.HbCDF	3		0%			1.17E-04
2.3.7.8.9-Hsc00	3		0%			2.17E-04
1.2.3.7.8.9-HuCDF	3	İ	0%			1.83E-04
12.3.7.8-PeC00 12.3.7.8-PeC0F	3	1	0% 0%			2.17E-04 1.33E-04
2.3.4.6.7.8-HisCOF	3		0%			1.33E-04
23.4.7.8-PeCOF	3	1	33%	4 60E-04	4.60E-04	2.70E-04
23.7.6-TC00	3	1	33%	7.20E-04	7.20E-04	3.90E-04
37A-TCOF	3	3	100%	4.00E-03	7.25E-03	5.22E-03
osal HpCDO	3	3	100%	1.20E-03	2.80E-03	2.20E-03
otal HpCDF	3	3	100% 33%	1.80E-03 6.00E-04	6.70E-03 6.00E-04	3.50E-03 3.67E-04
Total HisCOF	3	3	100%	7.20E-03	1.36E-02	9.37E-03
otal PeCDO	3	~	0%			2.17E-04
otal PeCOF	3	3	100%	8.50E-03	1.89E-02	1.27E-02
otal TCDO	3	1	33%	7.20E-04	7.20E-04	3.90E-04
foral TCDF	3	3	100%	1 41E-02	2.50E-02	1.78E-02

Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Reference Area Forage Fish Sauget Area I

<u> </u>		Τ	<del></del> _			
<b>3</b>	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds Herbicides, ug/kg	Analyzed	Detected	Detection	Detected	Detected	Concentration
2.4,5-T	3		0%			5.00
2,4,5-TP (Silvex)	3	ĺ	0%			5.00
2,4-D	3		0%			5.00
2,4-DB	3	1 1	33%	10	10	6.7
Dalapon  Dicamba	3 3	l	0% 0%			1000
Dichloroprop	3	1	33%	5.1	5.1	10 35
Dinoseb	3	\	~~~	J. 1	J. 1	50
MCPA[(4-chloro-2-methylphenoxy)-acetic a	3	1	33%	2400	2400	1467
MCPP[2-(4-chloro-2-methylphenoxy)-propan	3	ł	0%			1000
Pentachiorophenol	3	1	33%	2.2	2.2	5.2
Metals, mg/kg	_	_				
Aluminum Antimony	3 3	3	100% 0%	8.3	80	34 0.09
Arsenic	3	1	0%			1.47
Beryllium	l š		0%			0.47
Cadmium	3		0%			0.23
Chromium	3	3	100%	0.24	1.7	0.79
Copper	3	3	100%	0.42	0.54	0.47
Cyanide, Total	3		0%	i		5.00
Lead	3		0%			0.23
Mercury Nickel	3 3	3	100% 0%	0.046	0.051	0.049 4,70
Nickei Selenium	3	1	33%	0.56	0.56	4.70 0.35
Silver	3	• 1	0%	0.50	0.50	0.05
Zinc	3	3	100%	17	33	25
% Lipids	3	3	100%	1	2.6	1.8
PCB, ug/kg			10076		2,0	
Decachlorobiphenyl	3		0%			42
Dichlorobiphenyl	3		0%	ļ		8.33
Heptachlorobiphenyl	3		0%	1		25
Hexachlorobiphenyl	3		0%			17
Monochlorobiphenyl	3   3		0%			8.33
Nonachlorobiphenyl Octachlorobiphenyl	3		0% 0%			42 25
Pentachlorobiphenyl	3		0%			17
Tetrachlorobiphenyl	3		0%	-		17
Trichlorobiphenyl	3		0%			8.33
Total PCBs	ł					1
Pesticides, ug/kg						
4,4'-DDD	2		0%		,	8.25
4,4'-DOE	2	1)	50%	3.5	3.5	6.8
4,4'-DDT Aldrin	2 2	- 1	0% 0%	1		8.25 4,20
Alpha Chiordane	2		0%			4.20
alpha-BHC	2		0%	- 1		4.20
beta-BHC	2 }	J	0%	j		4.20
detta-BHC	2		0%			4.20
Dieldrin	2	1	50%	4.7	4.7	7.4
Endosulfan I	2		0%			4.20
Endosulfan II Endosulfan sulfate	2 2	ł	0%  0%			8.25 8.25
Endrin	2	ĺ	0%	ĺ	-	8.25
Endrin aldehyde	2		0%			8.25
Endrin ketone	2 ]		0%			8.25
Samma Chlordane	2	ľ	0%	ſ		6.7
gamma-BHC (Lindane)	2		0%			4.20
-leptachior	2	ļ	0%	J		4.20
Heptachlor epoxide Methoxychlor	2 2		0% 0%	ì		4.20 42
Toxaphene	2	[	0%	[		420
SVOCs, ug/kg						720
,2,4-Trichlorobenzene	3		0%			85
,2-Dichlorobenzene	3	j	0%	ļ		85
,3-Dichlorobenzene	3	ł	0%	ł		85
1,4-Dichlorobenzene	3	ļ	0%			85
2,2'-Oxybis(1-chloropropane)[bis(2-Chlor 2,4,5-Trichlorophenol	3 3		0%  0%			85 210
2,4,5-1 richloropheriol	3		0%	- {		85
2,4-Dichlorophenol	3		0%	ļ		85
2,4-Dimethylphenol	3 }		0%			85
2,4-Dinitrophenol	3 [	ſ	0%	ĺ		210
2,4-Dinitrotoluene	3	Ì	0%	ľ		85
2,6-Dinitrotoluene	3	j	0%	į		85
2-Chloronaphthalene	3		0%	į	[	851
2-Chlorophenol	3		0%			85
-Methyl-4,6-dinitrophenol -Methylnaphthalene	3 3	1	0%  0%	ſ	j	210 85
-Methylphenol (o-cresol)	3	]	0%			85 85

### Reference Area Forage Fish Sauget Area I

Compounds		T	Γ				
Compounds		-		France of	Minimum	Maria	Average
2-Niscoprilated   3	Compounds						Concentration
SA4-Natingsphannal (mbp-creacis)   3   3.3-Ci-chtonoprisordine   3   0%	2-Niscentine	<del></del>					210
3.3-Ochronoberocine   3			1				85
3-Misconsilve			l				85
4-Brounophersylphenyl other 4-Chroop-animylphenyl other 4-Chroopanimylphenyl other 4-Chroopanimylphenyl other 3							85
A-Chicosaminyphrenol A-Chicosaminyphrenol A-Chicosaminyphrenyl ether A-Chicosaminyphrenyl ether A-Chicosaminyphrenyl ether A-Chicosaminyphrenyl ether A-Chicosaminymen A-Chicosaminymen A-Chicosaminymen A-Chicosaminymen A-Chicosaminymen A-Chicosaminymen A-Chicosaminymen A-Chicosaminyphren A-Chicosam					ľ		210
A-Choopaniny/pharyl ether Choopaniny/pharyl e							85
A-Chrosphanylphanyl ether A-Miscophanol A-Miscophanol A-Miscophanol A-Correspitations 3 0% A-Miscophanol A-Correspitations 3 0% Accorrespitations 3 0% Bearco(a)pyrinte 3 0% Bearco(a)pyrinte 3 0% Bearco(a)pyrinte 3 0% Bearco(b)pyrinte 4 0% Bearco(b)pyrinte 4 0% Bearco(b)pyrinte 4 0% Bearco(b)pyrinte 4 0% Bearco(b)pyrinte 4 0% Bea							85 85
### Afficial Principle							85
Additional							210
Accinegiffluence   3						ĺ	210
Activacione   3							85
Authorizonia				0%			85
Berrio(s)   Survey		3		0%			85
Bestico(s)   Sucremination   3	Berzo(a)entivacene	3		0%			85
Berroot(s).Pulpreyterne   3	Benzo(a)pyrene	3		0%			85
Berisot/Sucretines   3							85
Dest2-Crisconstray) prethane   3	Beiss(6)n)belyers						85
bar(2-Chromosthyl) shrar   3							85
barg2-Ethythroxy(phthetate   3   3   100%   140   280					}		85
Bulgiteersylphenistee					140	200	85 197
Carbacote			3		140	250	197 85
Chrystene   3					1		85
Oxforcytphthatate Oxforcytphth					ſ		
Debarcos(Li)aristracine   3							85
Disensofar/Allenthracene   3							85
Description   18   37   100%   2.38   2.38   38   38   38   38   38   38   38		3		0%	1	i	85
Description   3	Diberzoluran	] 3		0%			85
Fluoramene	Disthylphthalate	] 3	3	100%	18	37	25
Place   3		4 1			,		85
Hexachtorobinosine Hexachtorobinosine Hexachtorobinosine Hexachtorobinosine Hexachtorobinosine Hexachtorobinosine Hexachtorosine Indexo(1,2,3-c)pyrene Ind						:	85
Heischtorobisciene Heischtorocyclopritatiene Heischtorocyclopritatiene Heischtorocyclopritatiene Heischtorocyclopritatiene Heischtorocyclopritatiene Horizothere  3 0% Heischtorocyclopritatiene 3 0% Horizotherocyclopritatiene 3 0% Historocyclopritatiene 4 0% Historocyclopritatiene 4							85
Hexachtorocyclopentacliene Hexachtorosthorie Hexachtorosthorie Hoderio(1,2,3-cd)pyrene Hoderio(1,2,3-cd)pyrene Hoderio(1,2,3-cd)pyrene Holdrosodi-n-propyternine Holdrosodi-n-propyternine Holdrosodiphring Holdrosodiphrinyternine Holdrosodiphrinyternine Holdrosodiphrinyternine Holdrosodiphrinyternine Holdrosodiphrinyternine Holdrosodiphrinyternine Holdrosodiphrinyternine Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdrosodiphring Holdro							85
Hesschtoroeinene   3			[				85
Indento(1.2.3-cd)pyreme   3   0%			1				85 85
Image: Comparison   Compariso	The state of the s						85
n-Hibrosodiphenylamine N-Hibrosodiphenylamine			1				85
Naphthalere			1				85
Naphshalene   3   0%							85
Persectionspherol 3 0% Phenol 3 0% Phenol 3 0% Pyrene 3 0% Pyrene 3 0%  Total PANs  Disclars and Furans, upto 12,34,6,7,8-9,000 3 1,805-02 4,7 12,34,6,7,8-9,000 3 2 67% 1,805-03 1,805-02 6,6 12,34,6,7,8-9,000 3 1 33% 1,805-03 1,805-03 3,5 12,34,7,8-9,000 3 1 33% 1,805-03 1,805-03 6,1 12,34,7,8-9,000 3 1 33% 1,805-03 1,805-03 6,1 12,34,7,8-9,000 3 0% 2,9 12,34,7,8-9,000 3 1,805-04 5,705-04 4,0 12,36,7,8-9,000 3 0% 1,8 12,37,8-9,000 3 0% 1,8 13,37,8-9,000 1		3	1	0%			85
Premission   3	Mirobergane	3		0%			85
Prent 3 0% Pyrene 3 0%  Total PANs  Dischass and Furans, tepts  123.46.7.8-9-0000 3 3 100% 2.23E-02 6.80E-02 4.7  123.46.7.8-9-0000 3 3 100% 1.80E-03 1.80E-02 6.6  1.23.46.7.8-10000 3 3 100% 1.80E-03 1.80E-03 3.5  1.23.47.8-10000 3 1 33% 1.80E-03 1.60E-03 6.1  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.47.8-10000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.48.0000 3 0%  1.23.48.00000 3 0%  1.23.48.0000 3 0%  1.23.48.0000 3 0%  1.23.48.0000 3 0%	Pentachlorophenol			0%			210
Pyrone 3 0%  Total PANs  Disciss and Furans, up/kg 12.34.67.8-9.000 3 3 100% 2.23E-02 6.80E-02 4.7 12.34.67.8-9.000 3 3 100% 2.23E-02 6.80E-02 4.7 12.34.67.8-9.000 3 3 100% 1.80E-03 1.80E-03 3.5 12.34.67.8-9.000 3 1.80E-03 1.80E-03 3.5 12.34.7.8-9.000 3 1 33% 1.80E-03 1.80E-03 6.1 12.34.7.8-9.000 3 0% 2.9 12.34.7.8-9.000 3 100% 2.30E-04 5.70E-04 4.0 12.36.7.8-9.000 3 0% 1.8 12.37.8-9.000 3 0% 1.00% 1.00E-04 5.00E-							85
Tetal PANs  Disches and Furans, uping  12348789-0000 3 3 100% 2.23E-02 6.80E-02 4.7  12348789-0000 3 3 100% 1.80E-03 1.80E-02 6.6  12348789-0000 3 3 100% 1.80E-03 4.70E-03 3.5  12348789-19000 3 1 33% 1.80E-03 1.80E-03 6.1  1234789-19000 3 0% 1.8  1234789-19000 3 0% 1.8  123678-19000 3 100% 2.30E-04 5.70E-04 4.0  123678-19000 3 0% 1.1  123789-19000 3 0% 1.1  123789-19000 3 0% 1.3  123789-19000 3 0% 1.5  123789-19000 3 0% 1.5  123789-19000 3 0% 1.5  123789-19000 3 0% 1.5  123789-19000 3 0% 1.5  123789-19000 3 0% 1.5  123789-19000 3 0% 1.3  234878-19000 3 0% 1.3							85
Disciss and Furans, uploy   12,34,87,89-OCDO	Pyrine	3		0%			85
Disciss and Furans, uploy   12,34,87,89-OCDO	Tetal PAHs_	-† I					
12346749-0000 3 3 100% 223E-02 6.80E-02 4.7 12346749-000F 3 2 67% 1.80E-03 1.80E-02 6.6 12346749-000F 3 3 100% 1.80E-03 1.80E-03 3.5 12346749-000F 3 1 33% 1.80E-03 1.80E-03 6.1 1234749-000F 3 0% 2.9 1234749-000F 3 100% 2.30E-04 5.70E-04 4.0 1236749-000F 3 0% 1.2 123749-000F 3 0% 1.1 123749-000F 3 0% 1.3 123749-000F 3 0% 1.3 123749-000F 3 0% 1.3 123749-000F 3 0% 1.3 123749-000F 3 0% 1.3 123749-000F 3 0% 1.3		1		······································			
123.46.78-HgCDF 3 100% 1.80E-03 4.70E-03 3.5 123.47.89-HgCDF 3 1 33% 1.80E-03 1.60E-03 6.1 123.47.89-HgCDF 3 0% 2.9 123.47.89-HgCDF 3 100% 2.30E-04 5.70E-04 4.0 123.67.89-HgCDF 3 100% 2.30E-04 5.70E-04 4.0 123.67.89-HgCDF 3 0% 1.1 123.7.89-HgCDF 3 0% 1.0 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.5 123.7.89-HgCDF 3 0% 1.3	1.2.3.4.6.7.8.9-OCDO	] 3	3	100%	2.23E-02	6.80E-02	4.76E-02
12.3.4.6.7.8-HgCDF 3 1.60E-03 1.60E-03 6.1 12.3.4.7.8-HgCDF 3 0% 1.8 12.3.4.7.8-HgCDF 3 0% 1.8 12.3.4.7.8-HgCDF 3 100% 2.30E-04 5.70E-04 4.0 12.3.4.7.8-HgCDD 3 100% 4.40E-04 6.60E-04 5.6 12.3.6.7.8-HgCDD 3 0% 1.1 12.3.7.8-HgCDD 3 0% 2.0 12.3.7.8-HgCDD 3 0% 1.9 12.3.7.8-HgCDD 3 0% 1.9 12.3.7.8-HgCDD 3 1 33% 9.50E-04 9.50E-04 4.1 12.3.7.8-HgCDD 3 1 33% 9.50E-04 9.50E-04 4.1 12.3.7.8-HgCDD 3 0% 1.3 12.3.7.8-HgCDD 3 0% 1.3							6.63E-03
12.3.47.8.9-bcCDF 3 0% 2.5 12.3.47.8-bcCDF 3 0% 1.8 12.3.47.8-bcCDF 3 0% 1.8 12.3.47.8-bcCDF 3 100% 2.30E-04 5.70E-04 4.0 12.3.67.8-bcCDF 3 0% 1.1 12.3.7.8-bcCDF 3 0% 2.0 12.3.7.8-bcCDF 3 0% 1.5 12.3.7.8-bcCDF 3 0% 1.5 12.3.7.8-bcCDF 3 0% 1.5 12.3.7.8-bcCDF 3 0% 1.5 12.3.7.8-bcCDF 3 0% 1.3 12.3.7.8-bcCDF 3 0% 1.3 12.3.7.8-bcCDF 3 0% 1.3 12.3.7.8-bcCDF 3 0% 1.3			_				3.57E-03
12.3.47,8-HsCDD 3 0% 1.8 12.3.47,8-HsCDF 3 3 100% 2.30E-04 5.70E-04 4.0 12.3.67,8-HsCDD 3 3 100% 4.40E-04 6.60E-04 5.6 12.3.67,8-HsCDD 3 0% 1.1 12.3.7,8-HsCDD 3 0% 2.0 12.3.7,8-HsCDF 3 0% 1.5 12.3.7,8-PsCDD 3 1 33% 9.50E-04 9.50E-04 4.1 12.3.7,8-PsCDD 3 0% 1.3 12.3.7,8-PsCDD 3 0% 1.3 12.3.7,8-PsCDF 3 0% 1.3			1 ;		1.60E-03	1.60E-03	6.17E-04
2.3.47,8-HsCDF		<u> </u>		~~			2.506-04
12.3.67.6-HsCDD 3 3 100% 4.40E-04 6.60E-04 5.8 12.3.67.6-HsCDF 3 0% 2.0 12.3.7.6-HsCDF 3 0% 2.0 12.3.7.6-HsCDF 3 0% 1.5 12.3.7.6-HsCDF 3 1 33% 9.50E-04 9.50E-04 4.1 12.3.7.6-HsCDF 3 0% 1.3 12.3.7.6-HsCDF 3 0% 1.3			_				1.836-04
12.38.76-HsCOF 3 0% 1.1 12.37.86-HsCOF 3 0% 20 12.37.86-HsCOF 3 0% 1.9 12.37.86-HsCOF 3 1 33% 9.50E-04 9.50E-04 4.1 12.37.86-HsCOF 3 0% 1.3 12.37.86-HsCOF 3 0% 1.3							4.00E-04
123789-biCDD 3 0% 20 123789-biCDF 3 0% 1.5 12378-biCDF 3 1 33% 9.50E-04 9.50E-04 4.1 12378-biCDF 3 0% 1.3 234878-biCDF 3 0% 1.3			3		4.40E-04	6.6UE-04	5.606-04
1.23.7.6.FHCOF 3 0% 1.9 1.23.7.6.FHCOF 3 1 33% 9.50E-04 9.50E-04 4.1 1.23.7.6.FHCOF 3 0% 1.3 23.4.6.7.6.HHCOF 3 0% 1.3	Transport Countries of the Countries of						1.17E-04
2.2.7.6-PeCOD 3 1 33% 9.50E-04 9.50E-04 4.1 2.2.7.6-PeCOF 3 0% 1.3 2.3.4.6.7.6-PeCOF 3 0% 1.3							2.006-04
2.2.7.6-PCOF 3 0% 1.3 2.3.6.7.6-PCOF 3 0% 1.3			1		9 50F-04	0.505.04	1.50E-04 4.17E-04
3 0% 1.3			•			J.JUE-04	1.336-04
							1.336-04
Landra and the Control of the Contro	23.4.7.8-PeCDF	3		0%			1.50E-04
·			3		4.60E-04	8.60E-04	6.00E-04
					_		3.01E-04

Note: One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Combined Summary Statistics for Largemouth Bass and Brown Bullhead Borrow Pit Lake Sauget Area I

Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Herbicides, ug/kg	- Aliailiten	PAIGCEG	Perection	D-Bracker	Defected.	Concentratio
2,4,5-T (ug/kg)	6		0%			5.0
2,4,5-TP (Silvex)	6	i	0%			5.0
2,4-D	6	]	0%	İ	l i	5.0
2.4-DB	6	}	0%		}	
						5.0
Dalapon	6		0%		1	10
Dicamba	6	1	17%	1.90	1.90	6.9
Dichloroprop	6	1 !	17%	6.60	6.60	
Dinoseb	6		0%		i	
MCPA[(4-chloro-2-methylphenoxy)-acetic a	6	1 1	17%	1,800.00	1,800.00	11
MCPP[2-(4-chloro-2-methylphenoxy)-propan	6		0%	.,000	1,000.00	. 10
Pentachlorophenol	6		0%			8.
			U761			<u>0</u> .
Aetals, mg/kg		_	}			
Numinum	6	5	83%	7.70	33.00	
Intimony	6		0%		l i	0.0
vrsenic (	6		0%		1	2.3
Beryllium	6	į	0%	i		0.4
Cadmium	6		0%	1		0.2
Chromium	6	6	100%	0.27	0.93	0.5
	6		100%	0.41		0.6
Copper		6		0.41	0.89	
yanide, Total	6	1	0%			
ead	6	1	17%	0.25	0.25	0.2
Mercury	6 }	5	83%	0.050	0.26	0.0
lickel	6	j	0%	ł		
elenium	6 (	. 2	33%	0.60	0.63	0.3
ilver	6	- }	0%	3.50	5.00	0.0
and the second control of the second control		[		اءر	امما	0.0
inc	6	6	100%	15	22	
Lipid	6	6	100%	0.30	1.8	
CB, ug/kg	<del>-</del> -	<del>~</del> *+	700 761		<del></del>	<del></del>
ecachlorobiphenyl	6	<b>§</b>	0%		1	
		ì		j	1	
ichlorobiphenyl	8	_ [	0%	4.0		!
eptachlorobiphenyl	6 [	2	33%	16	21	
exachlorobiphenyl	6 }	5	83%	43	150	
lonochlorobiphenyl	6 [	1	0%	1	ì	
onachlorobiphenyl	6	· · · · · ·	0%		i i	
ctachlorobiphenyl	8		0%	- 1		
entachlorobiphenyl	6 1	5	83%	30	130	
etrachlorobiphenyl	6	2	33%	19	46	
		- [		18(		
richlorobiphenyl	6 }	i	0%)		1	
otal PCBs	6 (	5 أ	83%	76	320	1
esticides, ug/kg						
4'-DDD	6	ł	0%			;
	6	أء		ا م		•
4'-DDE		5	83%	3.4	29	
A'-DDT	6 }	Į.	0%∤			
otal DDT	6	5	83%	3.4	29	
ldrin	6 }	j	0%i	}	i	
lpha Chlordane	6 (	1 }	17%	12	12	
pha-BHC	6	1	0%			
eta-BHC	6	į	0%	1		
atta-BHC	6	}		1		-
		ł	0%{	l	j	
ieldrin	6	į	0%	ļ	1	•
ndosulfan (	6 {	1	0%{	ļ		•
ndosulfan li	6	ŀ	0%[	ł	Í	•
ndosulfan sulfate	6	j	0%	i	1	
ndrin	6	Į	0%	i		
ndrin aldehyde	6	ł	0%		!	
		}		1	1	
ndrin ketone	6	_ }	0%			
amma Chlordane	6	3 {	50%	11	19	
ımma-BHC (Lindane)	6 }	1	0%]		ļ ļ	' ·
eptachlor	6	2	33%	1.5	2.8	
eptachlor epoxide	6	- 1	0%		}	
ethoxychlor	6	ł	0%	i	1	
		J		į	1	9
oxaphene	6		0%			3
/OCs, ug/kg	1	-1	· ·	ſ	ļ <b>,</b>	
2,4-Trichlorobenzene	6	1	0%	1	1	
2-Dichlorobenzene	6	į	0%		l	
3-Dichlorobenzene	6	į	0%	į		
4-Dichlorobenzene	6	ļ	0%			
		ŀ				
2'-Oxybis(1-chloropropane)[bis(2-Chlor	6	ł	0%	1		
4,5-Trichlorophenol	6	ì	0%			1
4,6-Trichlorophenol	6	Į.	0%		1	
4-Dichlorophenol	6		0%			
4-Dimethylphenol	6	ł	0%			
	6	ī			1	
4-Dinitrophenol		j	0%			2
	6)	1	0%	Ì	l l	
4-Dinitrotoluene						
4-Dinitrotoluene 6-Dinitrotoluene	6 }	ł	0%			
4-Dinitrotoluene 6-Dinitrotoluene		Ì	0% 0%			
4-Dinitrotoluene 6-Dinitrotoluene Chloronaphthalene	6   6		0%			
4-Dinitrotoluene 5-Dinitrotoluene	6 }					

# Combined Summary Statistics for Largemouth Bass and Brown Bullhead Borrow Pit Lake Sauget Area I

·	1	<del></del>	<u> </u>			
	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
2-Methylphenol (o-cresol) 2-Methylphenol (o-cresol)	6		0%			85 210
2-Nitrophenol	6		0%			85
384-Methylphenal (m&p-cresal)  3,3-Dictionabenzidine	5		0% 0%			85 85
3-Nimanine	6		0%			210
4-Bromophenylphenyl ether	6		0%			85
4-Chloro-3-methylphenol 4-Chloroeniline	6		0% 0%			85 85
4-Chlorophenylphenyl ether	6		0%			85
4-Miroanline	6		0%			210
4-Mirophenol Acentohihene	6		0% 0%			210 85
Acenephenylene	6		0%			85
Arithracene	6		0% 0%			85 85
Benzo(a)prene Benzo(a)pyrene	6		0%			85
Berzo(b)fluoranthene	6		0%			85
Berezo(g.h.i)perylene	6		0% 0%			85 85
Berzo(k)fluoranthene bis(2-Chloroethoxy)methene	6		0%			85
bis(2-Chicrosthyl)ather	6		0%			85
tio(2-Ethylhexy))phthelate	6	1	17%	97	97	90 85
Butylberzylphthelate Carbszole	6		0%			85
Chrystene	6		0%			85
D-n-busylphthalale D-n-occylphthalale	6	1	17% 0%	32	32	76 85
Olbertzo(a,h)enthracene	6		0%			85 85
Dibereofuran	6	_	0%			85
Distrytphthelate Distratrytphthelate	6	1	17% 0%	18	18	74 85
Pupramere	6		0%			85
Ruprene	6		0%			85
Herachtoroberzene Herachtorobetadiene	6		0% 0%			85 85
Hexachtorocyclopentadiene	6		0%			85
Herachtoroethene	6		0%			85
Indeno(1,2,3-cd)pyrene Isophorone	6		0% 0%			85 85
n-Hibrosod-in-propytemine	6		0%			85
N-Nitrosodiphenytamine/Diphenytamine Naphthelene	6		0% 0%			85 85
Mirobanzana	6		0%			106
Pentachiorophenol	6		0%			180
Phenedicuse Phanel	6		0% 0%			85 85
Pyrene	5		0%			85
Total PANs	6		0%			85
Diamins and Forens, ugiting						
12346749-0000	6	3	50%	1.02E-02	1.15E-02	8.71E-03
1,2,3,4,6,7,8,9-OCDF 1,2,3,4,6,7,9-HpCDD	6	3	50% 50%	6.55E-04 1.50E-03	1.20E-03 3.00E-03	9.61E-04 1.55E-03
1,2,3,4,6,7,8-HpCDF	6	1	17%	5.45E-04	5.45E-04	2.41E-04
1.2.3.4.7.8.9.HpCDF 1.2.3.4.7.8.HbCDD	6		0%	4 005 04	4 205 04	2.38E-04
1,2,3,4,7,8-HiCDF	6 6	1	17% 67%	1.80E-04 4.80E-04	1.80E-04 1.40E-03	2.05E-04 6.14E-04
1,2,3,6,7,8-HiCDO	6	4	67%	5.40E-04	2.40E-03	9.10E-04
1.2.3.6.7.8-Hi-COF	6 6	2	33%	2.30E-04	2.45E-04	1.88E-04
1,2,3,7,8,9+6CD0 1,2,3,7,8,9+6COF	6	1	0% 17%	6.90E-04	6.90E-04	1.92E-04 2.57E-04
1.2.3.7.8-PeC00	6	4	67%	4.20E-04	1.10E-03	6.49E-04
1,2,3,7,8 <del>-Pu</del> CDF 2,3,4,8,7,8-HuCDF	6	3	17% 50%	1.10E-03 1.80E-04	1.10E-03 3.80E-04	2.78E-04 2.52E-04
2.3.4.7.8-PeCOF	6	5	83%	7.10E-04	1.60E-03	2.52E-04 9.85E-04
2.3.7.6-TCD0	6	4	67%	3 30E-04	9.00E-04	6.44E-04
2,3,7,8-TCDF Total HgCDD	6	6 5	100%	1.20E-03	1.14E-02	6.05E-03
Total HgCOF	6	4	83% 67%	1.40E-03 1.80E-03	3.00E-03 6.70E-03	1.96E-03 4.14E-03
Total HiCDO	6	4	67%	5 40E-04	2.40E-03	1.03E-03
Total HuCDF	6	3	50%	1.06E-02	3.80E-02	2.06E-02
Total PeCDD Total PeCDF	6	4 3	67% 50%	4.20E-04 1.87E-02	1.18E-03 4.91E-02	7.01E-04 2. <b>79E-</b> 02
Total TCDD	6	3	50%	3.30E-04	1.20E-03	6.30E-04
Total TCDF	6	3	50%	2.20E-02	5.30E-02	3.56E-02

Note: One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Creek Sector F Plant Tissue Summary Statistics Sauget Area I

	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/kg						
2,4,5-T (ug/kg)	2		0%		l	5.0
2,4,5-TP (Silvex)	2		0%			5.0
2,4-D	2		0%			5.0
2,4-DB	2	i	0%			5.0
Dalapon	2		0%			1000
Dicamba	2	ا م	0%	_	_	10
Dichloroprop	2	1	50%	7	7	29
Dinoseb	2		0%			50
MCPA[(4-chloro-2-methylphenoxy)-acetic a	2		0%			1000
MCPP[2-(4-chloro-2-methylphenoxy)-propan	2		0%			1000
Pentachlorophenol	2		0%			10
Metals, mg/kg Aluminum	2	2	100%	30	44	] 37
Antimony	2	1	50%	0.13	0.13	0.12
Arsenic	2	2	100%	0.13	0.13	0.12
Beryllium	2	2	0%	0.42	0.56	0.50
Cadmium	2	1	50%	0.097	0.097	0.50
Chromium	2	•	0%	0.097	0.097	
		_		4.0	2.4	0.25
Copper	2	2	100%	1.9	2.1	2.0
Cyanide, Total	2	اہ	0%			5.0
Lead	2	2	100%	0.44	1.2	0.82
Mercury Nickel	2	2	0% 100%	ا م		0.0093
vickei Selenium	2 2	4	100%	1.2	2.6	1.9
Silver	2		0%			0.25 0.044
Zinc	2	2	100%	20	26	23
· · · · · · · · · · · · · · · · · · ·			100%	20		
PCBs and Pesticides, ug/kg						
Decachlorobiphenyl	2		0%	i		25
Dichlorobiphenyl	2		0%			5.0
leptachlorobiphenyl	2	ì	0%	ì		15
lexachlorobiphenyl	2		0%			10
Monochlorobiphenyl	2	1	0%	Į.		5.0
lonachlorobiphenyl	2		0%			25
Octachlorobiphenyl	2	1	0%	- 1		15
Pentachlorobiphenyl	2	i	0%			10
etrachlorobiphenyl	2	:	0%			10
richlorobiphenyl	2	J	0%			5.0
otal PCBs	2	J	0%[			15
,4'-DDD (ug/kg)	2	1	0%			13
,4'-DDE	2	ŀ	0%			13
,4'-DDT	2		0%			13
otal DDT	2		0%	0.04	0.04	13
ldrin	2	1 }	50%	0.81	0.81	3.9
Ipha Chlordane Ipha-BHC	2		0% 0%			7.0
eta-BHC	2			l		7.0
eta-BHC	2 2	ŀ	0% 0%	ļ		7.0
Pieldrin	2	1	0%	ł		7.0 13
ndosulfan I	2	i	0%	- (		7.0
ndosulfan II	2		0%			13
ndosulfan sulfate	2	i	0%			13
ndrin	2	l l	0%1	ļ		13
ndrin aldehyde	2		0%			13
ndrin ketone	2	ł	0%	1		13
Samma Chlordane	2	1	50%	3.1	3.1	5.1
amma-BHC (Lindane)	2	']	0%	ا'.''	5.1	7.0
leptachior	2	2	100%	1.8	1.9	1.9
eptachlor epoxide	2	-	0%		1.0	7.0
lethoxychlor	2	Į	0%{	(		70
oxaphene	2		0%			360
VOCs, ug/kg	<del>~</del> †					300
,2,4-Trichlorobenzene	2		0%			85
2-Dichlorobenzene	2	i	0%			85
3-Dichlorobenzene	2	J	0%	ļ		85
4-Dichlorobenzene	2	ł	0%	ł		85
2'-Oxybis(1-chloropropane)[bis(2-Chlor	2	1	0%			85
4,5-Trichlorophenol	2		0%			210
4,6-Trichlorophenol	2		0%			85
4-Dichlorophenol (ug/kg)	2		0%			85
4-Dimethylphenol	2	1	50%	51	51	68
4-Dinitrophenol	2		0%	- ' '	- '	210
4-Dinitrotoluene	2		0%			85
.4~DilkU0l0lu6li6	2	,	0%		'	85
		ì	0%	ſ		85
6-Dinitrotoluene	2	ı				
6-Dinitrotoluene -Chloronaphthalene	2			1		85
6-Dinitrotoluene -Chloronaphthalene -Chlorophenol	2 2		0%			
6-Dinitrotoluene -Chloronaphthalene -Chlorophenol -Methyl-4,6-dinitrophenol	2 2 2		0% 0%			210
6-Dinitrotoluene Chioronaphthalene Chiorophenol Methyl-4,6-dinitrophenol Methylnaphthalene	2 2 2 2		0% 0% 0%			210 85
6-Dinitrotoluene -Chloronaphthalene -Chlorophenol -Methyl-4,6-dinitrophenol	2 2 2		0% 0%			85 210 85 85 210

### Creek Sector F Plant Tissue Summary Statistics Sauget Area I

		1				
Camananda	Number	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentratio
Compounds 854-Mathylphanol (m&p-cresol)	Analyzed 2	Description 1	O%		-	Concession
(3-Oichtoroberzidine			0%			
<del>-</del>	2 2		0%			21
-Nibrogniine			0%			_
Bromophenylphenyl ether	2					
-Chloro-3-multy/phenol	2		0%			
Chloroeniine	2		0%			
-Chlorophenylphenyl ether	2		0%			
Historiine	2		0%			21
-Nisophenoi	2		0%			21
consphilhent	] 2		0%	1		
consphilitylane	2	1	50%	32	32	
rificacione	] 2		0%	Í		
lerzo(a)enthracene	] 2		0%			
erzo(a)pyrene	2	1	50%	140	140	11
enzo(b)fluoranthene	1 2	1	50%	59	59	7
enzo(g.h.i)perylene	2	1	50%	360	360	z
	2	1	50%	52	52	~
erzo(k)fluoranthene		•		32	32	
s(2-Chlorothary)methere	2		0%			
e(2-Chloroethyl)ether	2		0%		ı	
a(2-Ethylhexyl)phthalate	2		0%			
utylbenzylohthalate	2		0%			
hrysene	2		0%			
i-n-burylphihalate	2		0%			
-n-octylphthulate	1 2		0%			
bergo(a,h)trifiracene	2	1	50%	76	76	i
bergoluran	2		0%			
lathy/phthalate	1 2		0%			ì
imadiyilgi direkate	2		0%			ì
			0%			
voranifere.	2					
uorene	2		0%			
exactionoberosne	2		0%			1
exactionshutadiene	2		0%			
exactionocyclopentadiene	2		0%			ł
stachlorosifiene	2		0%			
deno(1,2,3-cd)pyrene	2	1	50%	300	300	19
apharane	2		0%			8
Misosodi-n-propylamine	2		0%			
Nisoeodiphenylamine/Diphenylamine	2		0%			ì
politicalene	2		0%			
4			0%			
boberzene	2					
entectiorophenol	2		0%			2
ARIBANA .	2		0%			
₩d į	2		0%			
Mana	. 2		0%			
Ital PANs	. 2		50%	1010	1010	
			30%	1019	1019	
eales and Furans, ug/kg		-				
2.3.4.6.7.8.9-OCOO	2	2	100%	5.69E-02	8.33E-02	7.01E-
23.4.6.7.8.9-OCDF	. 2	2	100%	2.26E-02	3.35E-02	281E-
2.3.4.6.7.8-HpC00	2	2	100%	7.40E-03	1.166-02	9.50E-
2.3.4.6.7.8-HpCDF	2	2	100%	5.70E-03	7 40E-03	6.55E-
2.3.4.7.8.9-HpCDF	2		0%			3.00E-
2.3.4.7.8-HICOO	ž		0%			2.50E-
1478-HICOF	2		0%			2.00E-
1678HC00	2		0%			2 506
.38.7.8→1±COF	2		0%			1.50E-
1789Hc00	2		0%			2.50E-
17AS-HICOF	2		0%			2.00E-
17.8-PeC00	2		0%			2.00E-
∆7.8-PeCOF	2		0%			1.75E-
4.6.7.8-HECOF	2		0%			1.75E-
4.7.8-PeCOF	2		0%			1.75E-
7.8-TC00	2		0%			2.25E-
7.4-TCDF	2		0%			2.00E
7.4-TCOF	2		U 76			2,000
	_	_		4 40=	0.465	
ы нусоо	2	2	100%	1.40E-02	2.11E-02	1.76E-
al HoCOF	2	2	100%	1 73E-02	2.56€-02	2.15E-
al HaCOO	2	2	100%	2.50E-03	3.206-03	2.85E-
tal HuCOF	2	2	100%	3.00E-03	6 406-03	4.70E4
tal PeCDO	2	_	0%			2.00E-
N PUCOF	2		0%			1.75E-
at 1COC	2	2	100%	2.80E-03	3.106-03	2.95E-

Note:
One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Summary Statistics for Reference Plant Tissue Data Sauget Area I

f	]	Ţ <u> </u>				
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Herbicides, ug/kg	Alalyzeu	Detected	Detection	Detected	Detected	Concentiaton
2,4,5-T	2		0%!			5.0
2,4,5-TP (Silvex)	2		0%	'		5.0
2,4-DB	2 2	ı	0% 0%			5.0 5.0
Dalapon	2	}	0%	۱ .		1000
Dicamba	2	1	50%	1.8	1.8	5.9
Dichloroprop	2	·	0%			50
Dinoseb	2		0%	١ .		50
MCPA[(4-chloro-2-methylphenoxy)-acetic a MCPP[2-(4-chloro-2-methylphenoxy)-propan	2 2		0% 50%	1300	1300	1000
Pentachlorophenol	2	1 1	50%	1300	1300	1150 6.0
Metals, mg/kg		·	- 50 %			
Aluminum	2	2	100%	160	360	260
Antimony	2		0%			0.10
Arsenic	2	1	50%	1.1	1.1	0.78
Beryllium Cadmium	2 2		0% 0%			0.50 0.25
Chromium	2	2	100%	0.25	0.53	0.25
Copper	2	2	100%	0.25	1.3	1.1
Cyanide, Total	2	_	0%			5.0
Lead	2 (	2	100%	0.3	0.64	0.47
Mercury	2		0%			0.01
Nickel	2		0%			5.0
Selenium Silver	2 2	1	0%  0%			0.25 0.048
Silver Zinc	2	2	100%	6.8	8.3	0.048 7.6
			100 /0			7.0
PCBs and Pesticides, ug/kg Decachlorobiphenyl	2	j	0%			25
Dichlorobiphenyl	2		0%			5.0
Heptachlorobiphenyl	2	i	0%			15
Hexachlorobiphenyl	2		0%			10
Monochlorobiphenyl	2		0%			5.0
Nonachlorobiphenyl	2	ĺ	0%(	ĺ		25
Octachlorobiphenyl	2 2	]	0%			15
Pentachlorobiphenyl Tetrachlorobiphenyl	2	J	0%  0%			10 10
Trichlorobiphenyl	2	1	0%			5.00
4.4'-DDD	2		0%			13
4,4'-DDE	2	- 1	0%			13
4,4'-DDT	2	Ĭ	0%			13
Aldrin	2	1	50%	1	1	4.0
Alpha Chlordane alpha-BHC	2 2		0%  0%			7.0 7.0
peta-BHC	2		0%			7.0
telta-BHC	2	j	0%			7.0
Dieldrin	2		0%			13
Endosulfan I	2	J	0%			7.0
ndosulfan II	2	ł	0%)			13
Endosulfan sulfate Endrin	2 2	I	0% 0%		Ì	13 13
Endrin aldehyde	2		0%			13
Endrin ketone	2	- 1	0%	ł		13
Samma Chlordane	ž	İ	0%		ļ	7.0
gamma-BHC (Lindane)	2	l	0%			7.0
leptachlor	2	1	50%	3.8	3.8	5.4
leptachlor epoxide Methoxychlor	2 2	[	0%[ 0%]			7.0 70
Toxaphene	2	ŀ	0%			360
SVOCs, ug/kg						
,2,4-Trichlorobenzene	2	ı	0%		ĺ	85
,2-Dichlorobenzene	2	ł	0%	-	- 1	85
,3-Dichlorobenzene	2	ŀ	0%			85
,4-Dichlorobenzene	2	}	0%			85
,2'-Oxybis(1-chloropropane)[bis(2-Chlor ,4,5-Trichlorophenol	2	ĺ	0%  0%	ĺ	(	85 210
2,4,6-Trichlorophenol	2 2		0%	Ì		85
,4-Dichlorophenol	2	,	0%)	j		85
4-Dimethylphenol	2	j	0%{			85
,4-Dinitrophenol	2	}	0%			210
,4-Dinitrotoluene	2	į	0%)	}		85
2,6-Dinitrotoluene	2 2	1	0% 0%	1		85 85
-Chloronaphthalene -Chlorophenol	2 2		0%			85 85
-Chioropherioi -Methyl-4,6-dinitrophenol	2	ł	0%	ł		210
-Methylnaphthalene	2	-	0%			85
-Methylphenol (o-cresol)	2	ĺ	0%		1	85
-Nitroaniline	2		0%		ľ	210
-Nitrophenol	2	ł	0%			85
&4-Methylphenol (m&p-cresol)	2	}	0%	}	ļ	85
,3'-Dichlorobenzidine	2		0%	1		85

### Summery Statistics for Reference Plant Tissue Data Sauget Area I

	Number	Number	Frequency of	مسنطا	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentrato
3-Nébosniline 1-Bromophenylphanyl ether	2 2		0%			21 8
i-Coloro-3-methylphenoi	2		0%			1 8
-Chloroanline	2		0%			6
-Chiorophenylphenyl ether	] 2	•	0%			
-Nirogniine	2 2		0% 0%			21 21
i-Nitrophenol Loursphihene	2		0%			4
Conspirity/one	] 2		0%			
Vriftracene	] 2		0%			1
Senzo(a)enthracene	2		0%		-77	
Benzo(a)pyrane Benzo(b)Buorandhane	2 2	2	100% 50%	15 16	37 16	
Senzo(g.hu)perylene	1 2	2	100%	240	390	3
lenzo(k)fluoranthene	2	1	50%	21	21	
es(2-Chloroethoxy)methene	2		0%	,		
is(2-Chloroethyl)ether	2		0%			
us(2-Ethylhexyl)phthelate Lutylbenzylphthalate	2 2		0% 0%		1	1 8
Zhysene	2		0%			ì
h-n-busylphthelate	] 2		0%			ě
i-n-oczytphiliulate	2	_	0%			
Nberzo(a.h)enthracene Nberzofuran	2 2	2	100%	180	400	25
hedryfetifielde	2		0%			3
Amen'ny to his halane	2		0%			ì
Northere	] 2		0%			8
promise	2		0%			
lexachiorobenzane	2		0% 0%			
lexachtorobutadiene lexachtorocyclopertadiene	2 2		0%			8
lexactions@nene	2		0%			è
ndeno(1,2,3-cd)pyrene	2	2	100%	220	440	33
ophorone	2		0%			8
-Nitrosod-n-propylamine	2 2		0% 0%			8
i-Nitrosodiphenykamine/Diphenykamine Isphihatene	2		0%			
Nobersene	2		0%			
ereactéorophenol	2		0%			21
henenityene henol	2		0% 0%			8
yeare .	2		0%			
factors and Fugrans, up/tg						
2348789-0000	2	2	100%	8.32E-02	8.71E-02	8.52E-0
2346789-OCDF	2	2	100%	6.20E-04	8.50E-03	4.58E-0
2.3.4.6.7.8 HpCDO	2	2	100%	2.10E-03	6 10E-03	4.10E-0
2.3.4.6.7.8-HpCDF	2	1	50%	1.40E-03	1.40E-03	7.50E-0
234789HpC0F 23478HbC00	2 2		0% 0%			3.00E-0 2.75E-0
2.3.4.7.8-HiCOF	2		0%			1.75E-0
2.3.6.7.6-Hic00	ž		0%			2.50E-0
2.3.6.7.8-HiCOF	2		0%			1.75E-C
2.3.7.8.9-HuCOO	2		0%			2.50E-0
2.3.7.8.9 HuCOF	3		0%			2.00E-0
2,3,7,8-PeCDD	2		0% 0%			2.25E-0 1.75E-0
3.4.6.7.8-HbCOF	ž		0%			1.75E-0
3.4.7.6-PeCDF	2		0%			1.75E-4
17.A-TC00	2		0%			2.25E-
17.6-TCOF	2		0%			2.00E-
1.7.6-TCOF sell HpCOO	2	2	100%	5.90E-03	1.27E-02	9.30E-0
Mai HipCOF	ž	1	50%	5.90E-03	5.90E-03	3.00E-0
HICOO	2	i	50%	1 40E-03	1.40E-03	9.00E-0
Rel HuCOF	2		0%			1.75E-0
PeCCO	2		0%			2.25E-0
	•		0%			1.75E-0
rei PeCOF	2 2		0%			2.25E-

Note: One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Borrow Pit Lake Shrimp Tissue Data Sauget Area I

<b>6</b>	Shrimp BP Comp				
Compounds	Concentration	ER Q			
Herbicides, ug/kg	] :				
2,4,5-T	10	U			
2,4,5-TP (Silvex)	10	U			
2,4-D	10	U			
2,4-DB	10	U			
Dalapon	2000	U			
Dichloropea	20 100	Ü			
Dichloroprop Dinoseb	100	ŭ			
MCPA[(4-chloro-2-methylphenoxy)-acetic a	2000	ŭ			
MCPP[2-(4-chloro-2-methylphenoxy)-propan	2000	Ū			
Pentachlorophenol	1.8	j			
Aluminum	28				
Antimony	0.16	J			
Arsenic	2.0	U			
Beryllium	1.0	Ü			
Cadmium	0.50	) Ú			
Chromium Copper	0.23 8.3	J			
Cuanida Total	10	U			
Lead	0.39	j			
Mercury	0.095	ŭ			
Nickel	10	ŭ			
Selenium	0.50	Ŭ			
Silver	0.090	Ĵ			
Zinc	16				
% Lipid	0.03				
PCBs and Pesticides, ug/kg					
Decachlorobiphenyl	100	U			
Dichlorobiphenyl	20	ũ			
Heptachlorobiphenyl	60	U			
Hexachlorobiphenyl	40	υ			
Monochlorobiphenyl	20	U			
Nonachlorobiphenyl	100	U			
Octachlorobiphenyl	60	U			
Pentachlorobiphenyl	40	U			
Tetrachlorobiphenyl	40	U			
Trichlorobiphenyl Total PCBs	20 40	Ü			
4.4'-DDD	4.0	ŭ			
1,4'-DDE	4.0	ŭ			
1,4'-DDT	4.0	ŭ			
Total DDT	4	ŭ			
Aldrin	2.0	U			
Upha Chlordane	2.0	IJ			
ipha-BHC	2.0	U			
peta-BHC	2.0	U			
lelta-BHC	2.0	U			
Dieldrin	4.0	Ü			
ndosulfan I	2.0	Ü			
ndosulfan II	4.0	U			
ndosulfan sulfate	4.0	U			
Endrin Endrin aldehyde	4.0 4.0	Ü			
ndrin kelone	4.0	ŭ			
Samma Chlordane	2.0	Ŭ			
amma-BHC (Lindane)	2.0	ŭ			
leptachlor	2.0	ŭ			
leptachlor epoxide	2.0	Ū			
Methoxychior	20	U			
oxaphene	110	U			
VOCs, ug/kg					
,2,4-Trichlorobenzene	340	U			
,2-Dichlorobenzene	340	U			
,3-Dichlorobenzene	340	Ų			
,4-Dichlorobenzene	340	Ü			
,2'-Oxybis(1-chloropropane)[bis(2-Chlor ,4,5-Trichlorophenol	340 840	U			
,4,5-1 richlorophenol	340	Ü			
,4-Dichlorophenol	340	ŭ			
,4-Dimethylphenol	340	ŭ			
,4-Dinitrophenol	840	Ū			
,4-Dinitrotoluene	340	Ũ			
,6-Dinitrotoluene	340	U			
-Chloronaphthalene	340	U			
-Chlorophenol	340	U			
-Methyl-4,6-dinitrophenol	840	U			
-Methylnaphthalene	340	U			
-Methylphenol (o-cresol)	340	υ			
-Nitroaniline	840	U			
-Nitrophenol	340 :	Ü			
&4-Methylphenol (m&p-cresol)	340	U			
	340	U			
,3'-Dichlorobenzidine -Nitroaniline	840	ŭ			

### Borrow Pit Lake Shring Tissue Data Sauget Area I

Compounds	Shrimp BP C Concentration	omp ER Q
4-Ottoro-3-methylpheno	340	υ
4-Chargenline	340	Ū
4-Charaphenylphenyl ether	340	U
4-Nitrosniline	840	U
4-Nitrophenol	840	U
Aceneonthene	340 340	Ü
Acerachityane Anthracene	340	U
Benzoja jerebracene	340	ŭ
Berzola joyrane	340	Ü
Benzo(b)Augrandhene	340	U
Berzo(g/u)peylene	340	U
Berzo(k)fluoranthene	340	U
os(2-Oronethon) methene	340 340	U
bs(2-Citythen) phihalate	340	ŭ
Sury/benzyenthaliste	340	ŭ
Carbattle	340	Ū
Ovysere	340	U
O-n-outylphilhistate	340	U
O-n-ocytonitalists	340	U
Operation)ingraceus	340	Ü
Oberesturan Oethykonheiste	340 44	U
Ornethylphihalate	340	U
- ugranthene	340	ŭ
Fuorene	340	Ū
exact combensarie	340	U
nexachlorobuladiene	340	U
exchargoperadere	340	U
neschorsehene nesno (123-coloviene	340 340	u
sopone roso(25-capyes	340	Ü
- Nerosod-in-propytemene	340	ũ
4 Narosodphenylamne Diphenylamne	340	Ü
Nachhelene	340	U
Next entered	340	U
Personarphend	840 340	Ü
Phendriftvane	340	u
7016	340	ŭ
Total PANs	340	U
Noxins and Furans, upling		
2.1467.89-OCDD	0.0198 0.0043	
2.34.67,84bC00	0.0031	
2.14.5.7.8-HpCDF	0.0015	
2.14.789HpCDF	0.0004	U
2.3.4.7,8-HiC00	0 0003	U
		U
	0 0002	
2.3.6.7.8-HxC00	0.0002	U
2.3.6.7.8-tbC00 2.3.6.7.8-tbC0F	0.0002 0.0002	U
2.3.6.7.8-HiCO0 2.3.6.7.8-HiCOF 2.3.7.8.9-HiCO0	0.0002 0.0002 0.0003	Ŋ
23.67.8+bCO0 23.67.8+bCOF 237.8+bCO0 237.85+bCOF	0.0002 0.0002	U
2.1.6.7.8+hCO0 2.1.6.7.8+hCOF 2.1.7.8.9+hCO0 2.17.8.9+hCOF 2.17.8.PhCO0	0.0002 0.0002 0.0003 0.0002	n n
23.67.8-HcCO0 23.67.8-HcCOF 237.8.9-HcCO0 237.8.9-HcCO0 237.8-PHCO0 237.8-PHCOF 24.67.8-HcCOF	0.0002 0.0002 0.0003 0.0003 0.0002 0.0002	טטטט
2.3.6.7.8+HcO0 2.3.6.7.8+HcO0 2.3.7.8.9+HcO0 2.3.7.8.9+HcO0 2.3.7.8.PHcO0 2.3.7.8.PHcO0 3.4.6.7.8-HcO0 3.4.7.8.PHcO0	0.0002 0.0002 0.0003 0.0003 0.0002 0.0002 0.0002	טטטטטטט
2.3.6.7.8+hCO0 2.3.6.7.8+hCO0 2.3.7.8.9+hCO0 2.3.7.8.9+hCO0 2.3.7.8.PhCO0 2.3.7.8.PhCO0 2.3.7.8.PhCO0 2.3.4.6.7.8.PhCO0 3.4.7.8.PhCO0 3.4.7.8.PhCO0 3.4.7.8.PhCO0	0.0002 0.0002 9.0003 0.0002 0.0003 0.0002 0.0002 0.0002	טטטטטט
2.1.6.7.8-HcCOO 2.1.6.7.8-HcCOF 2.17.8.9-HcCOF 2.17.8.9-HcCOF 2.17.8.PHcCOF 2.14.7.8.PHcCOF 3.4.7.8.PHcCOF 3.4.7.8.PHcCOF 3.4.7.8.PHcCOF 3.4.7.8.PHcCOF 3.4.7.8.PHcCOF 3.4.7.8.PHcCOF	0.0002 0.0002 0.0003 0.0003 0.0003 0.0002 0.0002 0.0002 0.0002	טטטטטטט
2.3.6.7.8+hCO0 2.3.6.7.8+hCO0 2.3.7.8.9+hCO0 2.3.7.8.9+hCO0 2.3.7.8.9+hCO0 2.3.7.8.9+hCO0 3.4.6.7.8+hCO0 3.4.6.7.8+hCO0 3.7.8-TCO0 3.7.8-TCO0 3.7.8-TCO0	0.0002 0.0002 0.0003 0.0003 0.0003 0.0002 0.0002 0.0002 0.0002 0.0002	טטטטטטט
237.89-HCD0 237.89-HCD0 237.8-PeCD0 23.7-8-PeCDF .34.67.8-HcCDF .34.7-8-TCD0 .37.8-TCD0 .37.8-TCD0 .37.8-TCDF	0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0008 0.0016	טטטטטטט
2.3.6.7.8-HsCO0 2.3.6.7.8-HsCO0 2.3.7.8.9-HsCO0 2.3.7.8.9-HsCO0 2.3.7.8.PsCO0 2.3.7.8.PsCO0 2.3.7.8.PsCO0 2.3.7.8.PsCO0 2.3.7.8.TCO0 2.	0.0002 0.0002 0.0003 0.0003 0.0003 0.0002 0.0002 0.0002 0.0002 0.0002	טטטטטטט
2.3.6.7.8-HsCO0 2.3.6.7.8-HsCO0 2.3.7.8.9-HsCO0 2.3.7.8.9-HsCO0 2.3.7.8.PsCO0 2.3.7.8.PsCO0 3.4.7.8.PsCO0 3.7.8.TCO0 3.3.7.8.TCO0 600 HsCO0	0.0002 0.0002 2.0003 0.0003 0.0003 0.0002 0.0002 0.0002 0.0002 0.0002 0.0008 0.0008 0.0008	טטטטטטט
2.3.6.7.8-HsCO0 2.3.6.7.8-HsCO0 2.3.7.8.9-HsCO0 2.3.7.8.9-HsCO0 2.3.7.8.PsCO0 2.3.7.8.PsCO0 2.3.7.8.PsCO0 2.3.7.8.TsCO0 3.7.8.	0.0002 0.0002 0.0003 0.0003 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0016 0.0016 0.0076 0.0046	טטטטטטט
2.3.6.7.8+HCOD 2.3.6.7.8+HCOD 2.3.7.8.9+HCOD 2.3.7.8.9+HCOD 2.3.7.8.9+HCOD 2.3.7.8.9+HCOD 3.7.8.7+HCOD 3.4.6.7.8.9+HCOD 3.7.8.7COD	0.0002 0.0002 0.0003 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0006 0.0016 0.0016 0.0016 0.0006 0.0006	טטטטטטט

Note: One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Summary Statistics for Reference Shrimp Data Sauget Area I

						<u> </u>
Compounds	Number Analyzed	Number Detected	Frequency of Detection	Minimum Detected	Maximum Detected	Average Concentration
Herbicides, ug/kg	Allalyzed	Detected	Detection	Detected	Detected	Concentration
2,4,5-T (ug/kg)	2		0%			5.00
2,4,5-TP (Silvex)	2	1	50%	1.3	1.3	3.15
2,4-D		•	0%			5.00
2,4-DB	2		0%			5.00
Dalapon	2		0%			1000
Dicamba	2		0%			10
Dichloroprop	2		0%			50
Dinoseb	2		0%			50
MCPAI(4-chloro-2-methylphenoxy)-acetic a	2		0%			1000
MCPP[2-(4-chloro-2-methylphenoxy)-propan	2	1	50%	4400	4400	2700
Pentachlorophenol	2	2	100%	1.5	3.9	2.70
Metals, mg/kg						
Aluminum	2	2	100%	60	100	80
Antimony	2		0%			0.09
Arsenic	2	1	50%	1.2	1.2	1.10
Beryllium	2		0%			0.44
Cadmium	2		0%			0.22
Chromium	2	2	100%	0.26	0.28	0.27
Copper	2	2	100%	8.5	16	12
Cyanide, Total	2		0%			5.00
ead	2	2	100%	0.38	0.61	0.50
Mercury	2	,	0%			0.04
Nickel	2		0%			4.35
Selenium	2 j	2	100%	0.47	0.61	0.54
Silver	2	2	100%	0.059	0.062	0.06
Zinc	2	2	100%	15	17	16
/ 11-13	2	2	4000			
& Lipid		2	100%	0.27	0.38	0.33
CBs and Pesticides, ug/kg	اء	ł	60/			
Decachlorobiphenyl	2		0%			50
Dichlorobiphenyl	2		0%			10
leptachlorobiphenyl	2		0%			30
lexachlorobiphenyl	2		0%			20
Aonochlorobiphenyl	2		0%			10
ionachlorobiphenyl	2	1	0%			50
Octachlorobiphenyl	2		0%			30
Pentachlorobiphenyl	2	1	50%	22	22	21
etrachlorobiphenyl	2		0%			20
richlorobiphenyl	2	1	0%			10
,4'-DDD (ug/kg)	2		0%			2.00
4'-DDE	2		0%			2.00
,4'-DDT	2		0%			2.00
ldrin	2		0%			1.00
Ipha Chlordane	2		0%			1.00
Ipha-BHC	2		0%			1.00
eta-BHC	2		0%			1.00
elta-BHC Jieldrin	2		0%			1.00
	2	ľ	0%	į	i	2.00
ndosulfan I	2		0%	1		1.00
ndosulfan li	2		0%			2.00
ndosulfan sulfate	2	l	0%		l	2.00
ndrin	2 2	Į	0%		l	2.00
ndrin aldehyde		į	0%			. 2.00
ndrin ketone	2	l	0%		1	2.00
iamma Chlordane	2 2	l	0% 0%	]		1.00
amma-BHC (Lindane)			0%			1.00 1.00
eptachlor eptachlor epoxide	2	l		1		
	2		0%			1.00
ethoxychlor	2 2		0% 0%			10 55
oxaphene VOC= up/kg			U76			55
VOCs, ug/kg 2,4-Trichlorobenzene	2	1	0%			170
2-Dichlorobenzene	2	l	0%			170
2-Dichlorobenzene 3-Dichlorobenzene	2		0%			170
4-Dichlorobenzene	2	Į.	0%	]		
	2	ĺ				170
2'-Oxybis(1-chloropropane)[bis(2-Chlor		1	0%			170
4,5-Trichiorophenol 4.6-Trichiorophenol	2 2		0%			420 170
	2	I	0%		i	170
			0% 0%		į	170
4-Dichlorophenol			U%	1		170
4-Dichlorophenol 4-Dimethylphenol	2	I				
4-Dichlorophenol 4-Dimethylphenol 4-Dinitrophenol	2 2		0%			
4-Dichlorophenol 4-Dimethylphenol 4-Dinitrophenol 4-Dinitrotoluene	2 2 2		0% 0%			170
4-Dichlorophenol 4-Dimethylphenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene	2 2 2 2		0% 0% 0%			170 170
4-Dichlorophenol 4-Dimethylphenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene Chloronaphthalene	2 2 2 2 2		0% 0% 0% 0%			170
4-Dichlorophenol 4-Dintertylphenol 4-Dintrophenol 4-Dintrotoluene 6-Dintrotoluene Chloronaphthalene Chloronaphthalene	2 2 2 2 2		0% 0% 0% 0% 0%			170 170 170 170
4-Dichlorophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene 6-Dinitrotoluene Chloronaphthalene Chlorophenol Methyl-4,6-dinitrophenol	2 2 2 2 2 2		0% 0% 0% 0% 0%			170 170 170 170 420
4-Dichlorophenol 4-Dinimethylphenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene 6-Dinitrotoluene Chioronaphthalene Chlorophenol Methyl-4,8-dinitrophenol Methyl-1,8-dinitrophenol	2 2 2 2 2 2 2 2 2		0% 0% 0% 0% 0% 0%			170 170 170 170 170 420 170
4-Dichlorophenol 4-Dinitrophenol 4-Dinitrophenol 4-Dinitrotoluene 6-Dinitrotoluene Chloronaphthalene Chlorophenol Methyl-4,6-dinitrophenol Methylnaphthalene Methylnaphthalene Methylphenol (o-cresol)	2 2 2 2 2 2 2 2 2 2		0% 0% 0% 0% 0% 0% 0%			170 170 170 170 170 420 170
4-Dichlorophenol 4-Dinitrylphenol 4-Dinitrotoluene 6-Dinitrotoluene 6-Dinitrotoluene Chloronaphthalene Chlorophenol Methyl-4,6-dinitrophenol	2 2 2 2 2 2 2 2 2		0% 0% 0% 0% 0% 0%			170 170 170 170 420

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### Summary Statistics for Reference Shrimp Data Sauget Area I

	Number	Number	Frequency of	Minimum	Maximum	
Compounds	Analyzed	Detected	Detection	Detected	Detected	Average Concentration
3&4-Methylphenol (m&p-cresol)	2		0%			1
3,3-Dichlorobenzoline	2		0%			1
3-Nitroaniine	2		0%			4
l-Bromophenylphenyl ether I-Chloro-3-melhylphenol	2 2		0% 0%			1 1
-Chioroeniine	2		0%			,
-Chlorophenylphenyl ether	2		0%			ĺ
l-Nitroenline	2		0%			4
l-Nibophenol	2		0%			4:
lærephthene	2		0%			11
Aconophibylane	2		0%			] 1
Anthracene	2		0%			1
Senzo(a)enthracene	2 2		0% 0%			1
Berzo(a)pyrene Berzo(b)fluoranthene	2		0%			1
Berzo(g/tu)perylane	2		0%			1
Senzo(k)fluoranthene	2		0%			1
se(2-Chlorosthoxy)methane	2		0%			1
xe(2-Chloroethyl)ether	2		0%			1
us(2-Ethylhexyl)phthelate	2	2	100%	92	96	_
Autylberusylphilitelese	2		0%			1
arbazole	2		0%			1
Drysene	2		0%			1
h-n-butylphdhafale X-n-oczylphdhafale	. 2		0% 0%			1
Nereo(a,h)entracene	. 2		0%			i
Denzauran	2		0%			i
hathylphthalaile	Ž	2	100%	57	59	•
Amen'nylof thetate	2		0%			1
lucranthere	2		0%			1
Juorene	2		0%			1
exactionobereans	2		0%			1
exactionbutadiene	2		0%			1
exactionocyclopertadiene	2		0% 0%			1
exachtoroethene ideno(1,2,3-od)pyrene	2		0%			1 1
icoporane	2		0%			· i
Nitrosod-n-propytamine	ž		0%			1
Nisceodphenylamine/Diphenylamine	2		0%			1
aphthalone	2		0%			1
laroberteane	2		0%			1
entachiorophenol	2		0%			4
henorithrene henol	2		0% 0%			1
years	2		0%			i
forths and Furans, up/kg						
2346789-0C00	2	2	100%	1.66E-02	2.99E-02	2.336-
2348789-OCDF	2	1	50%	1.10E-03	1.10E-03	6.75E
2.3.4.6.7.8-HpCDO	2	2	100%	1.10E-03	2.40E-03	1.75E-
2.3.4.6.7.8-HpCDF	2		0%			1.25E-
2.3.4.7.8.9-HpCDF	2		0%			2.00E
2.3.4.7.8-HicOO	2		0%			1.75E-
2.3.4.7.8.HLCDF	2		0%			1.006-
2,3,6,7,8-HuCOO 2,3,6,7,8-HuCOF	-		0% 0%			1.506-
Augustus AFT Milester	2	1	50%	6.90E-04	6.90E-04	1.00E- 4.45E-
	2			J. 302-104	J. 500-104	1.256
2.3.7.8.9 HiCOO	2	,	1,70			
2.3.7.8.9.HiCOO 2.3.7.8.9.HiCOF	2	·	0% 0%			1 75=-
23.7.8.9HiC00 23.7.8.9HiC0F 23.7.8.PHIC00		·	0% 0%			
23.7.89-HiCOD 23.7.89-HiCOF 23.7.8-PiCOD 23.7.8-PiCOF	2 2	·	0%			1. <b>25</b> E-
23.7 & S-HiCOO 23.7 & S-HiCOF 23.7 & PiCOO 23.7 & PiCOF 34.6.7 & HiCOF	2 2 2 2 2	·	0% 0%			1.25E- 1.00E-
23.7 A S-HICOD 23.7 A S-HICOF 23.7 A PHICOD 23.7 A PHICOD 3.4 A 7 A PHICOF 3.4 7 A PHICOF 3.4 7 A PHICOD	2 2 2 2 2 2	·	0% 0% 0% 0%			1.25E- 1.00E- 1.25E- 1.50E-
23.7 # 8-HiCOD 23.7 # 9-HiCOF 23.7 # P-HICOF 3.4 # 7 # HICOF 3.7 # TCOD 3.7 # TCOD	2 2 2 2 2	·	0% 0% 0% 0%			1.25E- 1.00E- 1.25E- 1.50E-
23.7 A S-HiCOD 23.7 A S-HiCOF 23.7 A PHICOF 3.4 A 7 A PHICOF 3.4 7 A PHICOF 3.7 A PICOF 3.7 A TCOF	2 2 2 2 2 2		0% 0% 0% 0% 0% 0%			1.25E- 1.00E- 1.25E- 1.50E- 1.00E-
23.7 A S-HiCOD 23.7 A S-HiCOF 23.7 A PiCOD 23.7 A PiCOF 3.4 A 7 A HICOF 3.4 A 7 A HICOF 3.7 A TCOD 3.7 A TCOD 3.7 A TCOF SAI HICOD	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2	0% 0% 0% 0% 0% 0%	3.50E-03	9.80E-03	1.25E- 1.00E- 1.25E- 1.50E- 1.00E-
23.7 A S-HiCOD 23.7 A S-HiCOF 23.7 A PHICOD 23.7 A PHICOF 3.4 A 7 A PHICOF 3.7 A TCOD 3.7 A TCOD 3.7 A TCOD 3.7 A TCOD 3.7 A TCOD 3.1 HiCOD 501 HiCOD	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2	0% 0% 0% 0% 0% 0% 100%	3.70E-04	1.00E-03	1.25E- 1.00E- 1.25E- 1.50E- 1.00E- 6.65E- 6.85E-
2.3.7.8.9-HiCOD 2.3.7.8.9-HiCOF 2.3.7.8.7-9-COF 3.4.7.8.7-9-COF 3.4.7.8.7-9-COF 3.7.8.7-COD 3.7.8.7-COF 3.7.8.7-COF 3.8.1 HiCOD 3.8.1 HiCOD	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2	0% 0% 0% 0% 0% 100% 100%	3.70E-04 2.30E-03	1.00E-03 7.10E-03	1.25E- 1.00E- 1.25E- 1.50E- 1.00E- 6.65E- 6.85E- 4.70E-
2.3.7.8.9-HiCOD 2.3.7.8.9-HiCOF 2.3.7.8.9-HiCOF 3.4.8.7.8-HiCOF 3.4.7.8-HiCOF 3.7.8-TCOD 3.7.8-TCOD 3.7.8-TCOF 3.7.8-TCOF 3.8.1 HiCOD 5.8.1 HiCOD 5.8.1 HiCOD	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2	0% 0% 0% 0% 0% 100% 100% 100%	3.70E-04 2.30E-03 6.20E-04	1.00E-03 7.10E-03 1.10E-03	1.75E- 1.25E- 1.00E- 1.50E- 1.50E- 1.00E- 6.65E- 6.85E- 4.70E- 8.60E-
2.3.7 # S-HiCOD 2.3.7 # S-HiCOD 2.3.7 # PiCOD 2.3.7 # PiCOD 3.4 # 7 # HiCOF 3.4 # 7 # HiCOF 3.7 # TCOD 3.7 # TCOD 3.7 # TCOD 3.7 # TCOF 3.8 # HiCOD 3.8 # HiCOD 3.8 # HiCOF 3.8 # HiCOF 3.8 # HiCOF 3.8 # HiCOF	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2	0% 0% 0% 0% 0% 100% 100% 100%	3.70E-04 2.30E-03 6.20E-04 2.00E-03	1.00E-03 7.10E-03 1.10E-03 4.20E-03	1.25E- 1.00E- 1.25E- 1.50E- 1.00E- 6.65E- 6.85E- 4.70E- 8.60E- 3.10E-
23.7 A S-HiCOD 23.7 A S-HiCOD 23.7 A S-HiCOF 23.7 A S-HiCOF 34.7 A S-HiCOF 34.7 A S-HICOF 34.7 A S-TCOD 37.7 A TCOD 37.7 A TCOD 37.7 A TCOD 381 HiCCOF 381 HiCCOD 381 HiCCOD	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2	0% 0% 0% 0% 0% 100% 100% 100%	3.70E-04 2.30E-03 6.20E-04	1.00E-03 7.10E-03 1.10E-03	1.25E- 1.00E- 1.25E- 1.50E- 1.00E- 6.65E- 6.85E- 4.70E- 8.60E-

Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Borrow Pit Lake Clarn Summary Statistics Sauget Area I

	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentratio
Herbicides, ug/kg						
2,4,5-T 2,4,5-TP (Silvex)	3 3		0% 0%			
2,4-D	3		0%			
2,4-DB	3	ł i	0%			
Dalapon	3		0%	ľ		433
Dicamba	3		0%			
Dichloroprop	3	3	100%	3.2	32	-
Dinoseb	3		0%			21
MCPA[(4-chloro-2-methylphenoxy)-acetic a	3		0%			433
MCPP[2-(4-chloro-2-methylphenoxy)-propan Pentachlorophenol	3	1	33% 0%	4000	4000	500
Metals, mg/kg			U76			
Numinum	3	3	100%	7.5	13	10
Antimony	3	, o	0%	,		0.0
<b>Vsenic</b>	3	1	33%	0.96	0.96	1.8
Beryllium	3		0%			0.45
Cadmium	3	2	67%	0.074	0.12	0.1
Chromium	3 [	3	100%	0.22	1.1	0.6
>opper	3	3	100%	0.6	0.99	0.8
Cyanide, Total	3		0%	ا ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ ـ		
ead	3	1	33%	0.25	0.25	0.2
Aercury lickel	3 3		0% 0%			0.0 4.5
Selenium	3		0%	[		0.2
ilver	3	1	33%	0.015	0.015	0.0
inc	3	3	100%	8.9	22	14.9
/ 1 - 1 - 1		J	4008			
6 Lipid PCB, ug/kg	3	3	100%	0.05	0.23	0.1
Decachlorobiphenyl	3		0%	-		33.:
Dichlorobiphenyl	3 )	1	0%			6.0
leptachlorobiphenyl	3	ſ	0%	[		20.0
lexachlorobiphenyl	3		0%			13.3
lonochlorobiphenyl	3		0%			
lonachlorobiphenyl	3 {	}	0%			33.
Octachlorobiphenyl	3		0%			20.0
entachlorobiphenyl	3		0%			13.3
etrachlorobiphenyl	3		0%			13.3
richlorobiphenyl	3	- 1	0%	1		
otal PCBs	3		_0%			13.0
esticides, ug/kg		_				
,4'-DDD	3	- 1	0%	- 1		1
4'-DDE 4'-DDT	3		0%  0%			1
otal DDT	3		0%			1
Idrin	3	l l	0%	1		6.1
lpha Chlordane	3	Í	0%	- 1	İ	6.1
pha-BHC	3		0%			6.
eta-BHC	3		0%			6.
elta-BHC	3		0%	}		6.1
ieldrin	3		0%			. 1
ndosulfan I	3		0%			6.
ndosulfan li	3	ĺ	0%			
ndosulfan sulfate	3	ļ	0%	1	ł	•
ndrin	3	į	0%	l		
ndrin aldehyde	3	1	0%			
ndrin ketone amma Chlordane	3   3	j	0% 0%			R
amma Chiordane amma-BHC (Lindane)	3 3	[	0%	1		6. <sup>-</sup>
eptachlor	3	1	33%	2.3	2.3	3.
eptachior epoxide	3	'	0%	2.0	2.5	6.
ethoxychlor	3	1	33%	5.4	5.4	J
oxaphene	3	.	0%	• • •		32
VOCs, ug/kg						
2,4-Trichlorobenzene	3		0%	1		1
2-Dichlorobenzene	3		0%	ľ		1
3-Dichlorobenzene	3	1	0%			1
4-Dichlorobenzene	3		0%			1.
2'-Oxybis(1-chloropropane)[bis(2-Chlor	3	ļ	0%			1
4,5-Trichlorophenol	3		0%			20
4,6-Trichlorophenol	3	ļ	0%			1:
4-Dichlorophenol	3	į	0%			1
4-Dimethylphenol	3	1	0%	J		1
4-Dinitrophenol	3		0%		1	21
4-Dinitrotoluene	3		0%			1
6-Dinitrotoluene	3		0%			1
Chloronaphthalene	3	ł	0%			1
Chlorophenol	3	l l	0%			1
Methyl-4,6-dinitrophenol	3		0%			2

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### Borrow Pit Lake Clarn Summary Statistics Sauget Area !

					•	
	Number	Number	Frequency of	مسجيد	Marine	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
2-Methylphenal (o-cresol)	3 3		0% 0%	:	l	11. 28
2-Nitroaniline 2-Nitrophenol	3		0%			113
3&4-Methylphenol (m&p-cresol)	3		0%			113
3,3-Oichloroberzidine	3		0%			11:
3-Nitroanline	3		0%			28
4-Bromophenylphenyl ether 4-Chioro-3-methylphenol	3 3		0%			11; 11;
4-Chioroeniline	1 3		0%			113
4-Chlorophenylphenyl ether	3		0%			11:
4-Miroenline	3		0%			28
4-Nitrophenol Acunephthene	3 3		0% 0%			28 11:
Acensphilhylene	3		0%			11:
Anthracone	3		0%			11
Benzo(a)anthracene	j 3		0%			11
Berzo(a)pyrene	3		0%			11:
Berzo(b)fluoranthene Berzo(g.hu)perylene	3 3		0% 0%			11: 11:
Berzo(t) Nuoranthene	3		0%			11:
be(2-Chloroethoxy)methane	3		0%			113
be(2-Choroethyl)ether	3	ا ـ	0%			113
tre(2-Ethythexyl)phthelate Burylbenzylphthalate	3	3	100% 0%	55	170	90 11:
Carbazole	3		0%	'		113
Chrysene	3		0%			113
On-in-bully/pht/hallate	3		0%			113
D-n-octylphthalate	3		0%			113
Oibenzo(auh)enthracene Oibenzofuran	3 3		0% 0%			113 113
O-est-y/phth-plate	3 /	3	100%	53	120	7:
Demotrylphshalate	3		0%			113
Rucarthere	3		0%			113
Fluorene Hexachiorobenzene	3 3		0% 0%			113 113
Hexactionbutadene	3		0%			113
Hexachlorocyclopentadiene	3		0%			113
Herachloroethene	3		0%			113
indeno(1,2,3-cd)pyrene	3		0%			113
tsophorone n-Hibrosodi-n-propytemine	3 3		0% 0%			113 113
N-Nitrosodiphenylamine/Diphenylamine	3		0%			113
Naphthalane	3	1	0%	1		113
Misobenzene	3 3		0% 0%			113
Pertachtorophenol Phananthrene	3		0%			280 113
Phenol	3		0%			113
Pyrame	3		0%			113
Total PAHs	3	ł	0%	ł		113
Noxine and Furanc, ug/kg						
2346789-0C00	3	3	100%	3.40E-03	1.51E-02	8.07E-03
23467A9-000F	3 3	ا.	0% 33%			3.67E-04
1 <u>23467,8-Hp</u> C00 12346,7,8-HpCDF	3	1	33%	1.40E-03	1.40E-03	6.17E-04 1.67E-04
234789+9COF	3	ł	0%			2.50E-0
23.4.7.6+ti-C00	3	- 1	0%			2.00E-04
23478-H-COF	3		0%			1.17E-0
2.3.6.7.8-H-CDD 2.3.6.7.8-H-CDF	3		0% 0%			1.67E-0
23789HiC00	3		0%			1.00E-0- 2.00E-0-
2.3.7.8.9+HCDF	3		0%			1.33E-0
23.7.8-PeC00	3		0%			1.33E-0
2378-PcC0F	3		0%			1.00E-0
23.4.6.7.8-HsCOF	3 3		0% 0%		+	1.006-0
3.7.8-TC00	3	1	0%			1.00E-04 1.00E-04
13.7.6-TCOF	1	1	100%	1.00E-03	1.00E-03	1.00E-0
3.7.4-TCOF	3	3	100%	3.10E-04	1.50E-03	8.23E-0
osal HpCDD	3	1	33%	3 40E-03	3.40E-03	1.28E-03
osal HpCDF	3	.	0%	5 60E 04	6 60E 04	2.00E-04
otal HuCOF	3	1	33% 0%	5.50E-04	5. <b>50E-</b> 04	2.83E-04 1.17E-04
otal PeCOO	3		0%			1.33E-0
otal PeCOF	3	2	67%	1.30E-03	1.40E-03	9.17E-04
otal TCOO	3	3	100%	1.70E-04	1.40E-03	8.90E-0
otal TCOF	3	3	100%	9.30E-04	8.00E-03	4.51E-0

Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

#### Reference Area Clam Summary Statistics Sauget Area I

	Number	Number	Frequency of	Minimum	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
Herbicides, ug/kg						
2,4,5-T 2,4,5-TP (Silvex)	3		0% 0%			2 2
2,4,5-1P (Silvex) 2,4-D	3		0%	•		2
2,4-0 2,4-DB	3		0%			2
Dalapon	3		0%			400
Dicamba	3		0%			4
Dichloroprop	3	3	100%	6.5	87	3
Dinoseb	3		0%			20
MCPA[(4-chloro-2-methylphenoxy)-acetic a	3	1	33%	1400	1400	746
MCPP[2-(4-chloro-2-methylphenoxy)-propan	3		0%			733
Pentachlorophenol	3		0%			4
Metals, mg/kg Aluminum	3	3	100%	14	26	1
Antimony	3	3	0%	14	20	0.09
Arsenic	3	1	33%	0.65	0.65	1.
Beryllium	3		0%	0.00	0.00	0.47
Cadmium	3	3	100%	0.16	0.61	0.43
Chromium	3	3	100%	0.79	2.2	1.
Copper	3	3	100%	1.6	2.4	2.
Cyanide, Total	3		0%			5.
.ead	3	2	67%	0.44	0.59	0.42
dercury	3	i	0%	ł	l	0.04
lickel	3	,	0%			4.
Selenium	3	1	33%	0.48	0.48	0.31
Silver Linc	3 3	ا	0% 100%			0.04
	3	3	100%	21	52	3
6 Lipid	3	3	100%	0.090	0.12	0.11
CB, ug/kg						
Decachlorobiphenyl	3		0%	ŀ	ļ	2
Dichlorobiphenyl	3	-	0%	}	}	
leptachlorobiphenyl	3		0%			1
lexachlorobiphenyl	3	í	0%	1		1
/onochlorobiphenyl	3		0%			
lonachlorobiphenyl Octachlorobiphenyl	3	ł	0%  0%	ł	ł	2
entachlorobiphenyl	3	1	0%	1	i	1
etrachlorobiphenyl	3	:	0%			i
richlorobiphenyl	3	- 1	0%	- 1	1	į
	٦		• • •	i		· ·
otal PCBs			0%			
esticides, ug/kg ,4'-DDD	3	l	0%			9. 9.
4'-DDE	3		0%			9.
4'-DDT	3		0%			5.
drin	3		0%			5.
ipha Chlordane	3	ĺ	0%	1		5.
pha-BHC	3		0%			5.
eta-BHC	3		0%	i	ì	5,
elta-BHC	3	ł	0%	- 1	ł	9.
ieldrin	3		0%			5.
ndosulfan I ndosulfan Ii	3	1	0%	l	ŀ	9.
ndosulfan ili ndosulfan sulfate	3	ļ	0%) 0%)	l	j	9. 9.
ndosultan suttate	3	ĺ	0%	1		9. 9.
ndrin aldehyde	3		0%	ŀ	İ	9.
ndrin ketone	3		ŏ%	!		5. 5.
amma Chlordane	3		0%			5.
amma-BHC (Lindane)	3		0%			5.
eptachlor	3		0%	1		5.
eptachlor epoxide	3	j	0%	ļ	j	5
ethoxychlor	3	1	0%	ł	1	26
oxaphene	3		0%			8
VOCs, ug/kg						
2,4-Trichlorobenzene	3		0%		İ	8
2-Dichlorobenzene	3	}	0%	ļ	ļ	8
3-Dichlorobenzene	3	,	0%			8
4-Dichlorobenzene 2-Ovybie/1-chloroppmpape)lbie/2-Chlor	3 3		0%  0%	1	ļ	8 21
2'-Oxybis(1-chloropropane)[bis(2-Chlor 4,5-Trichlorophenol	3	ļ	0%	Į		21 8
4,6-Trichlorophenol	3	ŀ	0%			8
4-Dichlorophenol	3		0%	1		8
4-Diamorophenol	3		0%			21
4-Dinitrophenol	3		0%		ļ	8
4-Dinitrotoluene	3	ļ	0%	ļ	]	6
6-Dinitrotoluene	3	-	0%	J	1	8
Chloronaphthalene	3	İ	0%	l		8
Chlorophenol	3	ļ	0%	ŀ	j	21
Methyl-4,8-dinitrophenol	3	i	0%	1	1	
Methylnaphthalene	3		0%	į		8
Methylphenol (o-cresol)	3		0%	ı		21

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### Reference Area Clam Summary Statistics Sauget Area !

	Number	Number	Frequency of	Ministra	Maximum	Average
Compounds	Analyzed	Detected	Detection	Detected	Detected	Concentration
2-Mitrophine	3		0% 0%			8
2-Nitrophenol 384-Methylphenol (m5p-cresol)	3		0%			8
3.3-Dichlorobenzidine	j š		0%	ľ		21
3-Mitroaniline	3		0%			
4-Bromophenylphenyl ether	3	ľ	0%			8
4-Chloro-3-methylphenol	] 3		0%			8
4-Chlorosniine	3		0%			8
4-Chlorophenylphenyl ether	3		0%			21
4-Nitroenline 4-Nitroenland	3 3		0% 0%			21 8
Acenephinane	3		0%			ì
Acenaphthylene	<b>1</b> 3		0%			
Anthracene	3		0%			8
Benzo(a)anthracene	3		0%			8
Benzo(a)pyrene	] 3		0%	J	ļ	8
Berzo(b)fluoranthene	] 3		0%			8
Benzo(g.lv)perylans	3		0%			8
Berzo(k)fluoranthene	3		0%			8
be(2-Chloroethoxy)methane	3 3	_	0% 100%	47	9-0	8
be(2-Chloroethyl)ether be(2-Ethylhexyl)phthelete	3 3	3	100%	47	73	
outer-compression provinces	3		0%	;		8
Carbazole	1 3		0%			
Chrysene	3		0%			ě
D- n-bulg-philhalate	] 3		0%			ē
Di-n-octylphthaliste	3	1	0%			8
Diberzo(a,h)entivacene	3		0%			8
Oberzouran	3	3	100%	49	59	5
Destriyantalis	3		0%'			8
Demailtylphilhalate	3 3	1	0% ~~			8
Ruoranthere Ruorane	3	1	0% 0%			8
teuschiorobersene	3		0%			8
teractionbutadene	3		0%			8
lexachtorocyclopentatione	3		0%			ě
lexactiorositiane	3		0%			8
ndeno(1,2,3-cd)pyrene	3		0%			8
sophorone	3		0%			8
-Narosod-n-propylamine	3		0%			8
l-Naceodphenylamine/Diphenylamine	3		0%			8
taphihatene disoberzane	3		0% 0%			8 21
Pertachlorophenol	3		0%			8
The residence	3		0%			ě
740	3		0%			ě
) reve	3	3	100%	8300.0	0.012	0.009
Ideal PAHs Heater and Furses, water						
23487AB-0000	3	3	100%	6.80E-03	1.24E-02	9.80E-0
23487890CDF	3	1	33%	1.80E-03	1.24E-02 1.80E-03	8.50E-0
2.3.4.6.7.8-HpC00	3	2	67%	5.90E-04	1.00E-03	6.63E-0
234678HbCDF	3	•	0%			1.67E-0
23.4.7.8.9-HpCOF	3		0%			2.50E-0
23478HbC00	3		0%			1.67E-0
2.3.4.7.8+bCDF	3		0%			1.00E-0
2387.8HbC00	3		0%			1.67E-0
2367.8HbCOF	3		0%			1.00E-0
2.3.7.8.9-HuCDO	3		0%			2.00E-0
2.3.7.8.9-ts-CDF	3		0%			1.50E-0
2378-Pc00 2378-Pc0F	3 3		0% 0%			1.50E-0
			0%			1,00E-0 1,00E-0
14678MCTE	-		0%			1,00E-0
1467846CDF	3					1.00E-0
34.7.8-PeCDF	3		n≪			
34.7.8-PeCOF 3.7.8-TCOO			0%			
3.4.7.8-PeCOF 3.7.8-TCO6 3.7.8-TCOF	3 3	1		2.50E-04	2.50E-04	
3.7.5-PCOF 3.7.5-TCOF 3.7.5-TCOF 3.7.5-TCOF	3	1 2	33%	2.50E-04 1.10E-03	2.50E-04 2.40E-03	1.67E-0
3.47.6-PeCOF 3.7.6-TCOF 3.7.6-TCOF 3.7.6-TCOF 088 HIPCOO	3 3 3	1 2			2.50E-04 2.40E-03	1,67E-0 1,30E-0
3.4.7.6-PeCOF 3.7.6-TCOF 3.7.6-TCOF 0ail HpCOO 0ail HpCOOF	3 3 3 3		33% 67%			1.67E-0 1.30E-0 2.00E-0
3.4.7.6-PeCOF 3.7.6-TCOF 3.7.6-TCOF cast HpCOF cast HpCOF cast HpCOF	3 3 3 3 3	2	33% 67% 0%	1.10E-03	2.40E-03	1.67E-0 1.30E-0 2.00E-0 2.20E-0
3.4.6.7.8-HacOF 3.4.7.8-PacOF 3.7.8-PacOF 3.7.8-TCOF 3.7.8-TCOF cast HpCOO cast HpCOO cast HacCOO cast HacCOF cast PacCOO	3 3 3 3 3 3 3	2	33% 67% 0% 33%	1.10E-03	2.40E-03	1.67E-0 1.30E-0 2.00E-0 2.20E-0 1.00E-0 1.50E-0
3.4.7.6-PeCOF 3.7.6-TCOF 3.7.6-TCOF 3.7.6-TCOF otal HgCOO otal HgCOOF otal HgCOOF otal HgCOOF otal PeCOF otal PeCOF otal PeCOF	3 3 3 3 3 3 3 3	2 1 2	33% 67% 0% 33% 0% 67%	1.10E-03 2.60E-04 2.50E-04	2.40E-03 2.60E-04 2.10E-03	1.67E-0 1.30E-0 2.00E-0 2.20E-0 1.00E-0 1.50E-0
3,47,6-PoCOF 3,7,6-TCOF 3,7,6-TCOF 3,7,6-TCOF  dail HpCOO  dail HpCOO  dail HpCOO  dail HpCOO  dail HpCOO  dail PpCOO  dail PpCOO	3 3 3 3 3 3 3	1	33% 67% 0% 33% 0%	1.10E-03 2.60E-04	2.40E-03 2.60E-04	1.67E-0 1.30E-0 2.00E-0 2.20E-0 1.00E-0

Note:

One-half the detection limit is used to represent non-detects in the calculation of average concentrations.

Table C-3.14
Snail Summary Statistics From Dead Creek Sections B, C, D and Reference Areas
Sauget Area I

	Number	Number	Detection	Minimum	Maximum	
	Analyzed	Detected	Frequency (%)	Detected	Detected	Average
Herbicides (ug/kg)	_ ا	]	]			5.0
2,4-D	5	1		1		5.0
2,4-DB	5		00		0.4	5.0
Dicamba	5	] 1	20	8.4	8.4	9.7
Dichloroprop	5	1.		6400	6400	50
MCPA	5	1	20	6400	6400	2080
MCPP	5 5	2	40	2600	3300	1780
Pentachlorophenol  Metals (mg/kg)		3	60	1.1	15	8.4
Aluminum	5	5	100	320	710	504
	5	1 1	20	0.12	0.12	0.10
Antimony Arsenic	5	5	100	1.5	2.0	1.7
	5	°	100	1.5	2.0	0.46
Beryllium		,	90	0.07	0.67	
Cadmium Chromium	5 5	4 5	80 100	0.07 0.89	0.67 3.1	0.34 1.9
	5	5	100		3.1 120	1.9 49
Copper	5	5 5	100	10 2.3	120	5.2
Lead Mercury	5	5	100	2.3	11	0.04
Nickel	5	5	100	1.7	21	7.5
Selenium	5	1	20	0.49	0.49	0.28
Silver	5	5	100	0.49	0.49	0.28
Zinc	5	5	100	12	110	48
% Lipids	5	5 5	100	0.090	0.26	0.16
PCBs (ug/kg)		5	100	0.090	0.26	0.16
Monochlorobiphenyl	5					6.0
Dichlorobiphenyl	5			]		6.0
Trichlorobiphenyl	5	1	20	22	22	9.4
Tetrachlorobiphenyl	5		40	76	200	63
Pentachlorobiphenyl	5	2	60	51	250	100
Hexachlorobiphenyl	5	2 3 3	60	26	110	49
Heptachlorobiphenyl	5	3	00	20	110	18
Octachlorobiphenyl	5					18
Nonachlorobiphenyl	5					30
Decachlorobiphenyl	5					30
Pesticides (ug/kg)	<del>                                     </del>					
4,4'-DDD	5					9.1
4,4'-DDE	5	2	40	29	30	16
4,4'-DDT	5	-	70	-	30	9.1
Aldrin	5					4.9
Alpha Chlordane	5	1				4.9
delta-BHC	5				[	4.9
Dieldrin	5					9.1
Endosulfan I	5					4.9
Endosulfan II	5					9.1
Endosulfan sulfate	5	1	20	3.7	3.7	9.1
Endrin aldehyde	5	-		•.,	- · · ·	9.1
Endrin ketone	5	1	20	7.1	7.1	7.9
Gamma Chlordane	5	3	60	9.5	41	15
gamma-BHC (Lindane)	5	9		[ ]	•	4.9
Heptachlor	5					4.9
Heptachlor epoxide	5	2	40	24	66	20
Methoxychlor	5	-	-10	-	"	49

Table C-3.14

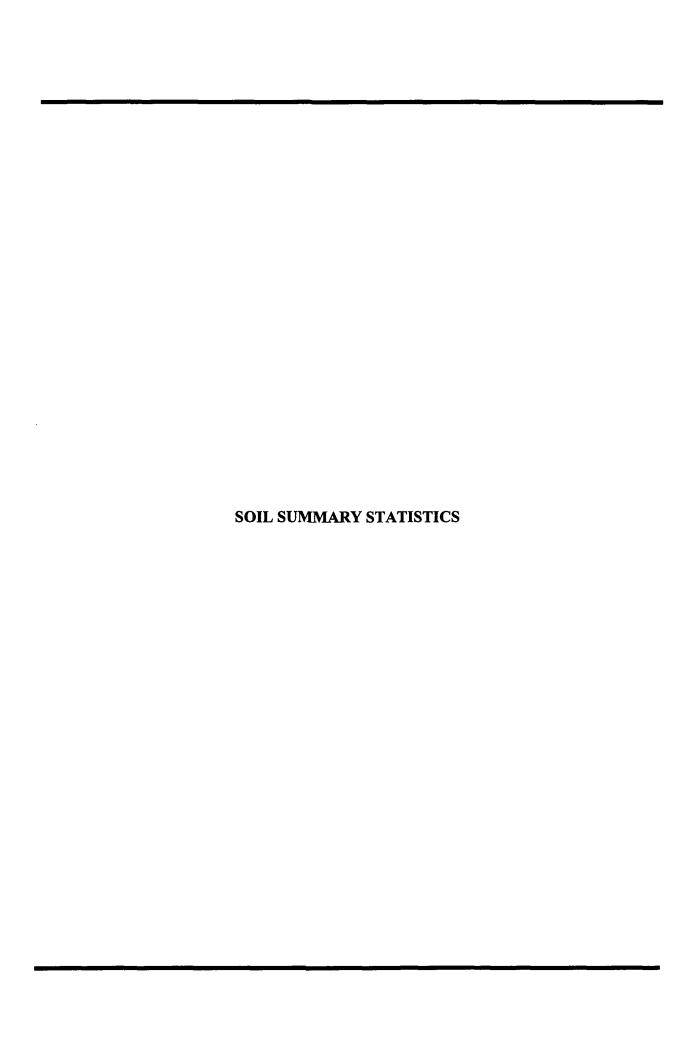
Snail Summary Statistics From Dead Creek Sections B, C, D and Reference Areas

Sauget Area I

<del></del>	<del></del>			т	<del></del>	<del></del>
	Number	Number	Detection	Minimum	Maximum	]
SVOCs (ug/kg)	Analyzed	Detected	Frequency (%)	Detected	Detected	Average
Acenaphthylene	5			[		102
Benzo(a)pyrene	5	1 1	20	31	31	91
Benzo(b)fluoranthene	5	li	20	79	79	101
Benzo(g,h.i)perylene	5	•	20	1 13	, ,	101
Benzo(k)Augranthene	5					102
bis(2-Ethylhexyl)phthalate	5	5	100	78	230	133
Di-n-butylohthalate	5		100	, ,	250	102
Dibenzo(a,h)anthracene	5				!	102
Diethytohthalate	5	5	100	54	63	59
Fluoranthene	5	3	100	<b>5</b> -	<b>63</b>	102
Indeno(1,2,3-cd)pyrene	5					102
Dioxins/Furans (ug/kg)	╅──┷			<del> </del>		
1,2,3,4,6,7,8,9-OCDD	5	5	100	0.29	13	3.7
1.2.3.4.6.7.8.9-OCDF	5	5	100	0.0014	6.0	1.5
1,2,3,4,6,7,8-HoCDD	5	5	100	0.0077	1.6	0.44
1,2,3,4,6,7,8-HoCDF	5	3	60	0.084	1.1	0.28
1.2.3.4.7.8.9-HoCDF	5	3	60	0.0054	0.073	0.018
1.2.3.4.7.8-HxC00	5	3	60	0.0022	0.0071	0.0028
1.2.3.4.7.8-Hb:CDF	5	3	60	0.0043	0.029	0.00824
1.2.3.6.7.8-HxCDD	5	3	60	0.0085	0.0599	0.01718
1.2.3.6.7.8-HxCDF	5	3	60	0.0015	0.0121	0.00362
1.2.3.7.8.9-HxCDD	5	3	60	0.0066	0.0239	0.0085
1.2.3.7.8.9-HxCDF	5	ī	20	0.0012	0.0012	0.00032
1,2,3,7,8-PeCDO	5	3	60	0.0026	0.006	0.00236
1,2,3,7,8-PeCDF	5	3	60	0.0006	0.0023	0.00082
2,3,4,6,7,8-Hb:CDF	5	3	60	0.0028	0.0207	0.00646
2,3,4,7,8-PeCDF	5	3	60	0.0021	0.0109	0.00353
2.3,7,8-TCDO	5	3	60	0.00061	0.0014	0.000672
2,3,7,8-TCDF (avg)	5	3	60	0.00385	0.01695	0.00562
Total HpCDD	5	5	100	0.0204	2.84	0.8091
Total HpCDF	5	5	100	0.00097	4.16	1.057034
Total HxCDD	5	5	100	0.0021	0.368	0.11636
Total HxCDF	5	4	80	0.00039	0.635	0.179188
Total PeCDO	5	3	60	0.0353	0.138	0.04508
Total PeCDF	5	3	60	0.0351	0.192	0.06381
Total TCOO	5	4	80	0.00035	0.526	0.13329
Total TCDF	5	3	_60	0.0533	0.231	0.08108

#### Note

One-half the detection limit is used to represent non-detects in the calculation of average concentrations,



Appendix C-4.1 Summary Statistics for Background Surface Soll Sauget Area I

			·				Shapiro-Wilke's Test for Normality(a)	Sun	imary Statistic	<b>.</b>	95% Upper Confidence Limit	
Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for	Dataset Distribution	Minimum	Méan	Maximum	UCL (b)	Site Concentration (c)
8280A	1998 Total TEQ w/ EMPC as ND	ppb	3	3	100%	Statistics 3	Lognormal	4.72E-03	6.19E-02	1.72E-01	9.55E+13	1.72E-01
HERB	MCPP[2-(4-chloro-2-methylphenoxy)-propan	ug/kg dw	3	3	100%	3	Normal	2.50E+03	4.98E+03	6.55E+03	8,65E+03	1.72E-01 6.55E+03
HERB	2.4.5-TP (Silvex)	ug/kg dw	3	3	100%	3	Normal	5.60E+00	8.68E+00	1.10E+01	1.31E+01	1.10E+01
HERB	MCPA[(4-chloro-2-methylphenoxy)-acetic a	ug/kg dw	3	] 3	100%	) 3	Lognormal	4.30E+03	7.25E+03	1.10E+01	2.93E+05	1.30E+04
METALS	Aluminum	mg/kg dw	3	3	100%	3	Lognormal	6.10E+03	1.27E+04	1.90E+04	7,29E+04	1.90E+04
METALS	Iron	mg/kg dw	3	j 3	100%	3	Lognormal	1.50E+04	1.90E+04	2.50E+04	3.95E+04	2.50E+04
METALS	Lead	mg/kg dw	3	3	100%	l š	Lognormal	2.40E+01	9.25E+01	1.80E+02	1,38E+06	1.80E+02
METALS	Magnesium	mg/kg dw	3	] 3	100%	] 3	Lognormal	3,20E+03	8.62E+03	1.70E+04	7,47E+06	1.70E+04
METALS	Manganese	mg/kg dw	3	3	100%	] 3	Lognormal	3,90E+02	4.42E+02	5.35E+02	6.57E+02	5.35E+02
METALS	Mercury	mg/kg dw	3	3	100%	3	Lognormal	4.40E-02	8.87E-02	1.40E-01	2.08E+00	1.40E-01
METALS	Molybdenum	mg/kg dw	3	3	100%	3	Lognormal	7.20E-01	1.01E+00	1.40E+00	3.02E+00	1.40E+00
METALS	Nickel	mg/kg dw	3	3	100%	3	Nomal	1.50E+01	2.13E+01	2.80E+01	3.23E+01	2.80E+01
METALS	Potassium	mg/kg dw	3	3	100%	3	Normal	1,30E+03	2.37E+03	3.50E+03	4.22E+03	3.50E+03
METALS	Silver	mg/kg dw	3	2	67%	3	Lognormal	3.25E-01	8.75E-01	1.10E+00	2,20E+01	1.10E+00
METALS	Sodium	mg/kg dw	3	1	33%	3	Lognormal	5,00E+01	2.88E+02	7.50E+02	3.67E+11	7.50E+02
METALS	Antimony	mg/kg dw	1	1	100%	1 1	NC	1.90E+00	1.90E+00	1.90E+00	NC	1.90E+00
METALS	Arsenic	mg/kg dw	3	3	100%	3	Lognormal	6,60E+00	9.57E+00	1.30E+01	2.90E+01	1.30E+01
METALS	Barium	mg/kg dw	3	l 3	100%	l 3	Normal	1.10E+02	1.82E+02	2.35E+02	2.90E+02	2.35E+02
METALS	Beryllium	mg/kg dw	3	1 3	100%	3	Lognormal	4,50E-01	7.53E-01	1.10E+00	4.90E+00	1.10E+00
METALS	Cadmium	mg/kg dw	3	3	100%	3	Lognormal	5.20E-01	4.32E+00	9.40E+00	2.50E+09	9.40E+00
METALS	Chromium	mg/kg dw	3	3	100%	3	Lognormal	1.70E+01	1.97E+01	2.50E+01	3.43E+01	2.50E+01
METALS	Cobalt	mg/kg dw	3	3	100%	3	Lognormal	5.50E+00	7.77E+00	1.04E+01	2,09E+01	1.04E+01
METALS	Copper	mg/kg dw	3	] 3	100%	3	Lognormal	3.50E+01	1.05E+02	1.90E+02	8.98E+04	1.90E+02
METALS	Vanadium	mg/kg dw	] з	3	100%	3	Lognormal	2.80E+01	3.45E+01	4.45E+01	8.53E+01	4.45E+01
METALS	Zinc	mg/kg dw	3	3	100%	3	Lognormal	8.20E+01	4.04E+02	8.20E+02	1,23E+08	8.20E+02
METALS	Calcium	mg/kg dw	Ìз	3	100%	3	Lognormal	4.00E+03	1.68E+04	4.00E+04	1.95E+10	4,00E+04
PCB	Total PCBs	ug/kg dw	1 3	2	67%	3	Lognormal	1.00E+01	6.00E+02	1.71E+03	1.91E+30	1.71E+03
PEST	4.4'-DDT	ug/kg dw	3	1 1	33%	3	Lognormal	2.00E+00	7.08E+00	1.70E+01	6.84E+06	1.70E+01
PEST	4.4'-DDE	ug/kg dw	3	1 1	33%	3	Lognormal	2.00E+00	8.06E+00	2.00E+01	7,22E+07	2.00E+01
SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	3	1 2	67%	3	Lognormal	1.05E+02	1.61E+02	2.68E+02	2.15E+03	2.68E+02
SVOA	Anthracene	ug/kg dw	3	1 1	33%	1 1	NC	8.00E+01	8.00E+01	8.00E+01	NC NC	8.00E+01
SVOA	Pyrene	ug/kg dw	3	1 2	67%	3	Lognormal	1,13E+02	2.18E+02	3.60E+02	5.37E+03	3.60€+02
SVOA	Benzo(g.h.i)perylene	ug/kg dw	3	2	67%	2	Lognomal	4.50E+01	6.35E+01	8.20E+01	NC NC	8.20E+01
SVOA	Benzo(b)fluoranthene	ug/kg dw	3	2	67%	2	Lognormat	6.90E+01	8.95E+01	1.10E+02	NC NC	1.10E+02
SVOA	Fluoranthene	ug/kg dw	3	2	67%	3	Lognormal	1.13E+02	2.51E+02	4.40E+02	2.04E+04	4.40E+02
SVOA	Benzo(k)fluoranthene	ug/kg dw	3	2	67%	3	Normal	6.00E+01	1.04E+02	1.40E+02	1.73E+02	1.40E+02
SVOA	Chrysene	ug/kg dw	3	2	67%	3	Lognormal	9.70E+01	1.37E+02	2.00E+02	5.42E+02	2.00E+02
SVOA	Benzo(a)pyrene	ug/kg dw	3	2	67%	3	Lognormal	6.00E+01	9.33E+01	1.50E+02	8.83E+02	1.50E+02
SVOA	Benzo(a)anthracene	ug/kg dw	3	2	67%	3	Lognomal	7.70E+01	1.29E+02	1.70E+02	5.25E+02	1,70E+02
SVOA	Diethylphthalate	ug/kg dw	3	3	100%	3	Normal	6.00E+01	9.33E+01	1.10E+02	1.42E+02	1.10E+02
SVOA	Di-n-butylphthalate	ug/kg dw	3	2	67%	3	Lognormal	1.05E+02	1.56E+02	2.40E+02	9.51E+02	2.40E+02
SVOA	Phenanthrene	ug/kg dw	3	2	67%	3	Lognormal	1.00E+02	1.68E+02	2.90E+02	4.04E+03	2.90E+02
SVOA	Carbazole	ug/kg dw	3	1 1	33%	1 1	NC	3.20E+01	3.20E+01	3.20E+01	, NC	3.20E+01
SVOA	Pentachlorophenol	ug/kg dw	3	2	67%	3	Lognormal	2.55E+02	3.71E+02	5.61E+02	1.90E+03	5.61E+02
VOA	2-Hexanone	ug/kg dw	3	1 1	33%	3	Normal	1.45E+01	1.65E+01	1.80E+01	1.95E+01	1,80E+01
VOA	Methylene chloride (Dichloromethane)	ug/kg dw	3	2	67%	3	Lognormal	1.70E+00	5.69E+00	1.20E+01	5.83E+04	1,20E+01

#### Appendix C-4.2 Summary Statistics for Floodplain Surface Soil Sauget Area I

				ļ			Shapiro-Willia's Tool for Hormshty(e)	Burgmack Statistics		:	98% Upper Contidence Limit	
Mothad	Conothuerd	Units	Surreion Applymen	Number of	Frequency of Detection	Humber of Samples for Statistics	Detacet Distribution	Minimum	Mean	Meximum	uar (m)	Site Consentration (s)
8280A	1996 Total TEQ w/ EMPC as NO	up/ng dw	20	29	100%	20	Lognamii	1 43E-03	8 32E-03	6 24E-02	1 07E-02	1 07E-02
HERR	Dicamba	ug/ng dw	66	18	23%	16	Lagnarméi	1.30E+00	3 62E+00	2 30E+01	4 90E+00	4 90E+00
HERD	MCPP	ug/ng dw	66	10	15%	66	Lagnormal	1 00E+03	1.74E+03	7 70E+03	1 AGE+03	1 80E+03
HERB	MCPA	ug/ng dw	66	13	20%	66	Lognormal	1 00E+03	1 dot:+03	7 40E+03	1 78E+03	1 78E +0 1
HFRB	2 4 D	LIGHTING INV	66	١ ١	3%	} >	1 coprormus	1 100 100	n nort+no	U NOF HOD	NC	บ mot- +เหย
HERB	2,4 DB	ug/kg dw	66	4	6%	06	Lispiscimul	4 266:400	0.40f+00	4 10E+01	n n2t +00	n n./f +00
MITALS	Akameum	mg/kg dw	66	60	100%	65	Logicumus	1 WF +01	U 101 101	1 POE+04	1 01F+04	1.016+04
METAL5	Mean	mg/kg dw	66	66	100%	66	Lagramai	4 100 +03	1.516+04	2 h0f+04	1.035+04	1 n 11: +04
METALS	Load	wti gifum	66	00	100%	66	Lognomyil	2 406+01	7.00E+01	2 not +02	/ MOF +01	/ NUE+01
METALS	Magnoskym	mg/kg r/w	66	86	100%	.00	l ogramiti	2 MOR +03	6 956 + G3	2 10k+04	n 46E+03	6.4661403
METALS	Manganese	mg/kg dw	66	66	100%	66	Lognormal	1 206 +02	1 UM: +02	1 20k+03	4 200:+02	4 200 +02
METALS	Morcury	mg/kg dw	66	66	100%	66	Lagnormal	2.70k-02	7 not: 02	6 70E 01	n 09£ 02	8 OUF 02
METALS	Michyladonum	mg/kg dw	66	64	SH1%	66	Lingnormal	2 20h-01	7.32f. 01	3 20E+00	B 14F 01	B 14P 01
METALS	Nickel	mg/kg dw	96	100	100%	5 66	Lognomial	1 206 +01	1016.01	6 60F+01	2 00€+01	2 001 +01
METALS	Polanskim	mg/kg dw	66	66	100%	66	Lognomial	1 20E+03	2 02E+03	3 NOE+03	2 14E+03	2 146+03
METALS	Silver	mg/kg dw	66	32	49%	66	Lognormal	2 00€-01	4 50E-01	0.00F-01	4 MAF-01	4 MME 01
METALS	Thailten	mg/tg dw	66	17	26%	65	Logocomusi	4 856-01	6.44F-01	1 40€ +00	6.77E-01	n //l: 01
METALS	Antimony	mp/vp dw	66	27	42%	65	Lognomal	3 166 01	1.150-00	2 406 +00	1 24E+00	1 241 +00
METALS	Arsanic;	wh gu/gm	66	66	100%	66	Lingmormal	2 00E+00	7.41E+00	3 408 +01	7 BBE +00	7 MAE+00
METALS	Bartem	mg/kg dw	60	66	100%	65	Lognormal	4 00E+01	1.80€ +02	1.20E+03	1 98E ±02	1.086+02
METALS	Baryllum	mg/kg dw	06	55	86%	65	Lognormal	1.70€-01	5 63E 01	1 10E+00	6.19€-01	กเด€ถเ
METALS	Cadmium	mg/kg dw	66	66	100%	65	Lingnormal	4 MOE-01	2 44E+00	8 40E+00	2 77E+00	7.77E+00
METALS	Chromium	mg/kg dw	95	66	100%	65	Lognormal	1 10E+01	1 89E+01	4 90E+01	1 79E+01	1.70E+01
METALS	Cohalt	mg/kg dw	66	66	100%	66	Lagnormal	7 NOE+00	n n2E+00	1.10€+01	7 01E+00	7.01E+00
METALS	Copper	mg/kg dw	65	66	100%	65	Lingnormal	1 MOE +() 1	4 00E+01	2 30E+02	8 09E+01	# 00F +01
METALS	Vanadium	mg/kg rlw	66	66	100%	86	Lognomusi	1.30E+01	2 M2E+01	1 20E+02	2 99E+01	2 99E+01
METALS	Zinc	mg/kg dw	ØÐ.	56	100%	86	Lagnomal	1 FINE +01	2 94E+02	1 40€+03	3 35E • OS	3 32E +05
METALS	Calcium	mg/kg dw	66	66	100%	66	Logonrinal	1 50E+03	2 81E+04	2 50€+06	3 04E+04	3 04E+04
METALS	Belenkum	mg/kg dw	66	18	28%	88	Lognormal	4 ROE-01	n 38E-01	3 50€+00	##E-01	8 41E-01
PCB	Total PC8s	ug/kg dw	66	63	82%	66	( ngnormal	1 50E+00	6 38E+01	3 886+02	9 04E+01	9.04E+01
PEST	Herptachior apparitie	ug/kg dw	66	16	28%	66	Lognormal	n uu€∙05	1.748+00	3.006+01	2 04E+00	2 04E+00
PEST	Endoulian sulfate	ug/kg dw	66	12	18%	40	Normal	0.30E-05	1 426+00	1 906+00	1 806+00	1 BDE +00
PEST	Aidrin	ug/ug dw	66	1	2%	66	l ognormål	u 00€:01	1 726+00	2 30E+01	1 886 +00	1.086 +00
PEST	alcoha: BHC	wayna dw	66	1 1	2%	1 1	NC	2 20E-01	2 20€ 01	2 20€-01	NC NC	2 20E-01
PEST	beta-BHC	ug/tg dw	65	7	11%	65	Lognormal	1 00E-01	6 03E-01	3 HOE+00	5 426-01	6.42E/01
PEST	clette-BHC	ug/ig dw	66	6	8%	6	Normal	8 20E-02	1 88E-01	2 40程-01	2 16€:01	2 INE-01
PEST	findonulfan II	ug/ng dw	68	1	2%	1	NC NC	1 00E+00	1 00億+00	1 00E+00	NC	1 00億+00
PEST	4,4'-DOT	ug/ng dw	66	31	48%	65	Lognormal	1 20€-01	8 81E+00	1 400+02	7 96E+00	7 96E+00
PEST	Alpha Chlordane	ug/kg dw	66	13	20%	66	Lognormal	1 00€-01	2 745+00	5 40E+01	2 55E+00	2.66€+00
PEST	Gamma Chlordane	up/up dw	66	14	22%	65	Lognomal	1 00€-01	4 09€+00	7 40E+01	3 20€+00	3 26€+00
PEST	Endrin kelone	ug/kg dw	65	24	37%	61	Lognormal	1 205-01	1 61E+00	4 95€+00	2 502+00	2 MOE+00
PEST	gamma-BHC (Lindans)	ug/kg dw	65	2	3%	2	Lognorm#	8 70E-02	1 09€-01	1.30E-01	NC	1 30E-01
PEST	Dieldrin	ug/lig dw	65	19	29%	66	Lognormal	8 90E-02	4 25E+00	1.20E+02	3 86E+00	3 MdE+00
PEST	Endrin	ug/kg dw	65	4	6%	60	Lognormal	1 00E-01	1 98E+00	6 10E+00	2 31E+00	2 31E+00
PEST	Methoxychlor	ug/kg dw	65	24	37%	62	Lognormal	9 30E-01	8 67E+00	3 80E+01	1.16E+01	1 16E+01
PEST	4.4'-DDD	ug/kg dw	65	5	8%	65	Lognormal	5 60E-01	2 98E+00	3.60E+01	3 01E+00	3 01E+00
PEST	4.4 DOE	ug/ig dw	65	35	54%	65	Lognormal	8.60E-02	3 21E+00	5.40E+01	4 04E+00	4 04E+00

#### Appendix C-4.2 Summary Statistics for Floodplain Surface Soil Sauget Area I

							Shapiro-Wilke's Test for Normality(a)	Sun	mary Statistic	:5	95% Upper Confidence Limit	
		i	Number of Samples	Number of	Frequency of	Number of Samples for					1 1	
Method	Constituent	Units	Analyzed.	Detecta	Detection	Statistics	Dataset Distribution	Minimum.	Mean	Maximum :	UCL (b)	Site Concentration (c)
PEST	Endrin aldehyde	ug/kg dw	65	3	5%	60	Lognormal	2.40E-01	1.97E+00	5.06E+00	2.16E+00	2.16E+00
PEST	Heptachlor	ug/kg dw	65	4	6%	65	Lognormal	3.40E-01	2.79E+00	9.10E+01	1.98E+00	1.98E+00
SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	65	19	29%	65	Lognormal	2.90E+01	1.04E+02	4.30E+02	1.11E+02	1.11E+02
SVOA	Anthracene	ug/kg dw	65	15	23%	65	Lognormal	2.60E+01	1.58E+02	2.30E+03	1.52E+02	1.52E+02
SVOA	Pyrane	ug/kg dw	65	32	49%	65	Lognormal	7.20E+01	5.33E+02	8.50E+03	4.43E+02	4,43E+02
SVOA	Dibenzofuran	ug/kg dw	65	5	8%	65	Lognormal	4.50E+01	1.09E+02	7.70E+02	1.12E+02	1.12E+02
SVOA	Benzo(g,h,i)perylene	ug/kg dw	65	24	37%	65	Lognormat	3.80E+01	1.97E+02	2.20E+03	2.01E+02	2.01E+02
SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	65	18	28%	65	Lognormal	5.10E+01	1.92E+02	2.00E+03	1.95E+02	1.95E+02
SVOA	Benzo(b)fluoranthene	ug/kg dw	65	36	55%	65	Lognormal	2.70E+01	3.03E+02	4.40E+03	2.82E+02	2.82E+02
SVOA	Fluoranthene	ug/kg dw	65	39	60%	65	Lognormal	3.70E+01	6.48E+02	1.00E+04	5.58E+02	5.58E+02
SVOA	Benzo(k)fluoranthene	ug/kg dw	65	26	40%	65	Lognormal	3.70E+01	2.72E+02	3.40E+03	2.49E+02	2.49E+02
SVOA	Acenaphthylene	ug/kg dw	65	4	6%	4	Lognormal	2.40E+01	4.55E+01	7.50E+01	1.74E+02	7.50E+01
SVOA	Chrysene	ug/kg dw	65	41	63%	65	Lognormal	2.80E+01	3.40E+02	4.90E+03	3.19E+02	3.19E+02
SVOA	Benzo(a)pyrene	ug/kg dw	65	26	40%	65	Lognormal	4.30E+01	2.61E+02	3.60E+03	2.26E+02	2.26E+02
SVOA	Dibenzo(a,h)anthracene	ug/kg dw	65	12	18%	65	Lognormal	2.60E+01	8.91E+01	8.10E+02	9.03E+01	9.03E+01
SVOA	Benzo(a)anthracene	ug/kg dw	65	37	57%	65	Lognormal	2.30E+01	2.93E+02	4.30E+03	2.66E+02	2.66E+02
SVOA	Acenaphthene	ug/kg dw	65	9	14%	65	Lognormal	1.60E+01	1.19E+02	1.20E+03	1.24E+02	1.24E+02
SVOA	Diethylphthalate	ug/kg dw	65	1 1	2%	1	NC	3.90E+01	3.90E+01	3.90E+01	NC NC	3.90E+01
SVOA	Di-n-butylphthalate	ug/kg dw	65	10	15%	65	Lognormal	3.20E+01	9.46E+01	1.70E+02	1.00E+02	1.00E+02
SVOA	Phenanthrene	ug/kg dw	65	34	52%	65	Lognormal	2.20E+01	4.61E+02	9.20E+03	3.66E+02	3.66E+02
SVOA	Butylbenzylphthalate	ug/kg dw	65	3	5%	65	Lognormal	5.70E+01	9.97E+01	3.40E+02	1.03E+02	1.03E+02
SVOA	Fluorene	ug/kg dw	65	7	11%	65	Lognormal	4.40E+01	1.26E+02	1.40E+03	1.26E+02	1.26E+02
SVOA	Carbazole	ug/kg dw	65	11	17%	65	Lognormal	5.80E+01	1.25E+02	1.00E+03	1.27E+02	1.27E+02
SVOA	Pentachlorophenol	ug/kg dw	65	36	55%	65	Lognormal	2.21E+02	2.67E+02	7.40E+02	2.78E+02	2.78E+02
SVOA	Naphthalene	ug/kg dw	65	2	3%	2	Normal	4.10E+01	6.00E+01	7.90E+01	1.80E+02	7.90E+01
SVOA	2-Methylnaphthalene	ug/kg dw	65	3	5%	3	Lognormal	6.15E+01	6.62E+01	7.20E+01	NC	7.20E+01
VOA	Ethylbenzene	ug/kg dw	65	1 1	2%	47	Normat	2.05E+00	2.73E+00	3.00E+00	2.78E+00	2.78E+00
VOA	Tokuene	ug/kg dw	85	13	20%	65	Lognormal	2.05E+00	3.19E+00	1.20E+01	3.34E+00	3.34E+00
	Chlorobenzene	ugkg dw	65	1	2%	64	Lognormal	2.05E+00	2.88E+00	4.00E+00	2.95E+00	2.95E+00
VOA	Xvienes, Total	ug/kg dw	65	;	2%	65	Lognormal	2.05E+00	2.91E+00	4.20E+00	2.99E+00	2.99E+00
VOA	1	ug/kg dw	65	3	5%	3	Normal	4.80E+00	6.10E+00	6.90E+00	8.01E+00	6.90E+00
VOA	2-Hexanone		65	32	49%	65	Lognormal	2.05E+01	1.77E+02	6.70E+02	2.83E+02	2.83E+02
VOA	Acetone	ug/kg dw	65	5	8%	65	Lognormal	1.80E+00	2.88E+00	4.80E+00	2.97E+00	2.97E+00
VOA	Benzene Methylene chloride (Dichloromethane)	ug/kg dw ug/kg dw	65	3	5%	6	Normal	1.80E+00	2.16E+00	2.40E+00	2,36E+00	2.36E+00
VOA VOA	Carbon disulfide	ug/kg dw	65	3	5%	65	Lognormal	2.05E+00	2.90E+00	4.30E+00	2.98E+00	2.98E+00
VOA	2-Butanone (MEK)	ug/kg dw	65	23	35%	65	Lognormal	9.10E+00	1.93E+01	4.70E+01	2.09E+01	2.09E+01
VOA	Trichloroethene	ug/kg dw	65	1 4	6%	65	Lognormal	2.05E+00	2.97E+00	6.20E+00	3,07E+00	3.07E+00

Appendix C-4.3 Summary Statistics for Site G Surface Soil Sauget Area I

							Shapiro-Milia's York for Normality(2)	Rur	nmacı Statistic		88% Upper Cardidense Limit	
Method	Constituent	Units	Number of Semples Analysis	Number of Detects	Frequency of	Humber of Samples for Statistics	Dutacet Distribution	Minimum	Mean	Maximum	UCL (M	Site Consentration (c)
A2NOA	I SUA TOUR TEQ W EMPC AS NO	He/te	1		100%	4	Lagnormal	# 13E-04	3 05E-03	8 35E-03	1.32E+00	<b>8 36€-03</b>
METALS	Aluminum	mg/kg dw	4	4	100%		Normal	9 30E+03	1.30E+04	1 50E+04	1 50E +04	1 50E+04
METALS	Iron	mg/kg dw	4	4	100%	4	Normal	1 80E+04	1 84E+04	2 00E+04	2 06E+04	2 00E+04
METALS	Lead	mg/kg dw		4	100%	۱ ،	Lognormal	1 10E+01	1.36E+01	1 60E+01	1 83E +01	1 AOE +01
METALB	Magnesium	mg/kg dw	1 4	4	100%	4	Lognormal	3 30E • 03	4 09£+03	4 90E +03	5 52E +03	4 96E+03
METALS	Manganasa	mu/kg dw	4	4	100%	4	Normal	2 doe+02	5 44E+02	7.40E+02	7 866-+02	7.40E+02
METAL B	Marcury	mu/sg dw	4	4	100%	1 4	Numal	I SOE OZ	2 45E-02	2 GOE -02	3 /3E Q/	2 NOE 02
METALB	Molybdenum	mysty dw	4	4	100%		Logenormal	1 800 01	5 tut of	7 80F 01	10 461 0	/ MOF 101
METALB	Nichal	HINDAU ON	4	4	100%	4	Logramus	1 /00 +01	1 800 +01	2 19E •01	J 17€+01	2 15€±01
METALS	Polassium	mg/kg dw	4	4	100%	1 4	Lognormal	1 20€+03	1.455.+01	1.70E+03	1876+01	1 /01:03
METAL B	Antimony	mp/p dw	١ ،	,	2006	) ,	Normal	a pot of	0.85E-01	7 20E 01	0.000-01	7 206 01
METALS	Arsenic	mp/kg dw	4	4	100%	1 4	Normal	6 50E +00	7 19E+00	8 06F +00	# 14E+00	H (186:+00)
METALB	Burken	mp/kg dw	4	4	100%	4	Normal	7 保庫+01	1.1/6.407	1 401 +02	1 400:+02	1 40€+02
METALB	tieryllum	mg/kg dw	4	4	100%	4	Normal	5 10E 01	5 89E 01	6.401-01	6 57F 01	B 40€ Q1
METALS	Cadmium	mg/kg dw	1 4		100%	[ 4	Lognormal	1 805 01	2 606 01	3 901:01	5 04F 01	1 90£ 01
METALS	Chromium	mu/va dw	4	4	100%	4	Normal	1 502 +01	1.036+01	2 201 +01	2 2M2 +01	2.206+01
ME TALS	Cobell	mg/kg dw	4	4	100%	4	Normal	00+90B d	7.33E+00	8 60F +00	N 199° +00	N 001 100 N
METALS	Copper	mg/kg dw	1 4	4	100%	4	Lagnormal	1 006+02	1 836 +02	7 UMF +07	0.000.02	2 90€+02
METALS	Variatium	mg/kp dw			100%	1	Normal	3.20€+01	3 588 +01	4.008+01	4 000 401	4 000:+01
METALS	Zinc	mp/kg dw		) a	100%	۱ .	Lagnormai	10+3011 6	6.098.+01	6 958 +01	NC NC	6.968+01
ME TALS	Galctum	mp/kg dw		] .	100%	4	Normal	5.10(5.403	9738+03	1.40F+04	1.406.404	1.400+04
PCB	Total PCBs	up/kg dw	4	2	50%	4	Lognomel	7 UOE+00	1.812.01	4 895+01	7 70F +02	4 050 +01
PEST	Philippe softmation (	ug/kg dw	1 4	1	25%	1 1	NC	2.20F.01	2.70E-01	2.20F-01	NC.	2 20F 01
PEST	Fridmeulten sulfate	ug/ng dw	4	1 2	90%	1 2	Normal	1.206.01	1.50E-01	1 BOE 01	3.39E-01	1 80E-01
PEST	dette-BHC	ug/kg the	4	1 3	75%	1 3	Lognormal	5 NOE-02	1.03E-01	1 AZE-01	3 40€ •00	1 MZE-01
PEST	Freimudian II	ug/kg the	۱ 4	1	25%	1 1	NC NC	3 40E-01	3 40E-01	1.40E-01	NC NC	3 40E-01
PEST	4.4' 001	wh putpu	4	3	75%	3	Lognormal	8 45E-02	1.15E-01	1 80E-01	3316.01	1 80E-01
PEST	Alutus Chlordane	(49/kg the	1 4	2	50%	7	Normal	1 206-01	1 90E-01	Z 60E-01	6.32€-01	2 00E-01
PEST	Garring Chlordane	wh parker	1 4	3	75%	) 5	Normal	7.70E-02	2 02E-01	3 10€-01	4 00E-01	3 10E-01
PEST	Freirin kelpne	wb gafus	1	2	50%	1 2	Normal	7 DOE-01	9 10E-01	1 03E+00	1 87E+00	1 03E 400
PEST	Diekirin	ug/lig the		1 1	20%	1 1	NC NC	6 20E-02	6 20€-02	6 208-02	NC NC	6 20E-02
PEST	Endon	IID/NO dw	1 4	,	90%	1 2	Normal	1 40E-01	1 4ME-01	1 886-01	1 96E-01	1 85E-01
PEST	Methoxychini	ug/kg dw	1 4	l i	25%	l i	NC	9 40E-01	9.40E-01	9 40€-01	NC	9 40E-01
PEST	Fruitin aldehyde	up/kg dw	1 4	1 2	80%	,	Lognormal	1 20€ 01	3 95E-01	6.70€-01	NC NC	6.70E-01
PEST	Endoulian I	ug/kg dw	1 1	1 :	26%	1 ;	NC	2 20€-01	2 20E-01	2 20E-01	l NC	2 20€ 01

Appendix C-4.4 Summary Statistics for Site H Surface Soil Sauget Area I

				Γ							<del>                                     </del>	<del></del>
(	· '						Shapiro-Wilke's Test				95% Upper	
	e Salara da a				ji		for Normality(a)	Sum	mary Statistic	8	Confidence Limit	]
1			Number of Samples	Norther of	Frequency of	Number of Samples for			1			
Method	Constitueng	Unite	Analyzed	Detects	Detection	Statistics	Dataset Distribution	Minlinum	Mean	Maximum	UCL (b)	:: Sita Concentration (c)
8280A	1998 Total TEQ w/ EMPC as ND	ug/kg	4	4	100%	4	Lognormal	3.45E-02	5.33E-01	1.29E+00	1.77E+06	1.29E+00
HERB	2,4-DB	ug/kg dw	4	2	50%	4	Normal	4,30E+00	6.74E+00	9.70E+00	9.94E+00	9.70E+00
METALS	Aluminum	mg/kg dw	4	4	100%	4	Lognormal	4.30E+03	7.95E+03	1.40E+04	3.92E+04	1.40E+04
METALS	kon	mg/kg dw	4	4	100%	4	Normal	1.40E+04	1.63E+04	1.80E+04	1.83E+04	1.80E+04
METALS	Lead	mg/kg dw	4	4	100%	4	Normal	5.30E+01	1.48E+02	2.30E+02	2.44E+02	2.30E+02
METALS	Magnesium	mg/kg dw	4	4	100%	4	Normai	8.90E+02	2.02E+03	2.50E+03	3,07E+03	2.50E+03
METALS	Manganese	mg/kg dw	4	4	100%	4	Normal	9,80E+01	4.37E+02	7.20E+02	7.39E+02	7.20E+02
METALS	Mercury	mg/kg dw	4	4	100%	4	Lognormal	6.40E-02	2.84E-01	7.70E-01	1.42E+02	7.70E-01
METALS	Molybdenum	mg/kg dw	4	4	100%	4	Lognormal	9.80E-01	4.95E+00	1.10E+01	9.82E+02	1.10E+Q1
METALS	Nickel	mg/kg dw	4	4	100%	} 4	Lognormal	2.00E+01	3.40E+01	7.00E+01	2.15E+02	7.00E+01
METALS	Potassium	mg/kg dw	4	4	100%	4	Lognormal	8.30E+02	1.16E+03	1.60E+03	1.89E+03	1.60E+03
METALS	Silver	mg/kg dw	4	Į 3	75%	4	Normal	5.10E-01	1.39E+00	2.70E+00	2.64E+00	2.64E+00
METALS	Sodium	mg/kg dw	4	4	100%	<b>1</b> 4	Normal	1.10E+02	2.48E+02	3.90E+02	3.96E+02	3.90€+02
METALS	Thallium	mg/kg dw	4	1	25%	4	Lognormal	4.70E-01	1.01E+00	2.50E+00	3.00E+01	2.50E+00
METALS	Antimony	mg/kg dw	4	4	100%	[ 4	Normal	6.90E-01	1.57E+00	2.30E+00	2.37E+00	2.30E+00
METALS	Arsenic	mg/kg dw	4	1 4	100%	1 4	Lognormal	8.50E+00	2.28E+01	6.40E+01	7.22E+03	6.40E+01
METALS	Barlum	mg/kg dw	4	4	100%	4	Normal	9.90E+01	1.12E+02	1.20E+02	1.24E+02	1.20E+02
METALS	Beryllium	mg/kg dw	4	4	100%	] 4	Lognormal	7.30E-01	1.52E+00	3.80E+00	4.69E+01	3.80E+00
METALS	Cadmium	mg/kg dw	4	4	100%	4	Lognormal	2.70E+00	9.03E+00	2.20E+01	2.17E+03	2.20E+01
METALS	Chromium	mg/kg dw	4	4	100%	4	Normal	1.50E+01	1.95E+01	2.30E+01	2.34E+01	2.30E+01
METALS	Cobalt	mg/kg dw	4	4	100%	4	Lognormal	5.20E+00	1.00E+01	2.00E+01	8.61E+01	2.00E+01
METALS	Copper	mg/kg dw	l 4	4	100%	1 4	Normal	2.00E+02	3.75E+02	4.80E+02	5.33E+02	4.80E+02
METAL\$	Vanadium	mg/kg dw	4	4	100%	4	Lognormal	2.00E+01	3.00E+01	4.50E+01	6.90E+01	4.50E+01
METALS	Zinc	mg/kg dw	4	4	100%	4	Lognormal	3.50E+02	1.28E+03	3.60E+03	6.29E+05	3.60E+03
METALS	Calcium	mg/kg dw	4	4	100%	4	Lognormal	5.90E+03	1.76E+04	4.20E+04	1.07E+06	4.20E+04
METALS	Selenium	mg/kg dw	1 4	3	75%	1 4	Lognormal	4.20E-01	1.58E+00	4.70E+00	9.42E+02	4.70E+00
PCB	Total PCBs	ug/kg dw	4	3	75%	4	Normal	8.50E+00	6.60E+02	1.52E+03	1.56E+03	1.52E+03
PEST	Heptachlor epoxide	ug/kg dw	1 4	3	75%	. 4	Lognormal	5.90E-01	1.84E+01	4.40E+01	1.11E+12	4.40E+01
PEST	Aldrin	ug/kg dw	4	2	50%	4	Normal	9.00E-01	8.21E+00	2.10E+01	1.94E+01	1.94E+01
PEST	Endosulfan II	ug/kg dw	4	1 1	25%	3	Lognormal	1,70E+00	3.57E+00	7.20E+00	1.85E+03	7.20E+00
PEST	4,4'-DDT	ug/kg dw	4	3	75%	1 4	Lognormal	1.70E+00	4,51E+01	1.10E+02	1.17E+10	1.10E+02
PEST	Gamma Chlordane	ug/kg dw	4	2	50%	4	Normal	9.00E-01	1.47E+01	3.00E+01	3.35E+01	3.00E+01
PEST	Endrin ketone	ug/kg dw	4	3	75%	( 4	Lognormal	1.40E+00	2.50E+01	8.20E+01	1.02E+10	8.20€+01
PEST	Methoxychlor	ug/kg dw	4	2	50%	4	Lognormal	9.00E+00	4.54E+01	1.30E+02	2.00E+05	1.30E+02
PEST	4.4'-DDE	ug/kg dw	4	į 3	75%	[ 4	Lognormal	1.70E+00	3.44E+01	8.60E+01	8.00E+08	8.60E+01
PEST	Heptachior	ug/kg dw	4	1 1	25%	3	Lognormal	9.00E-01	1.28E+00	2.00E+00	8.26E+00	2.00E+00
SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	1 4	2	50%	4	Lognormal	9.00E+01	1.04E+02	1.20E+02	1.26E+02	1.20E+02
SVOA	Pyrene	ug/kg dw	4	3	75%	4	Normal	9.00E+01	1.58E+02	1.90E+02	2.13E+02	1.90E+02
SVOA	Benzo(g,h,i)perytene	ug/kg dw	1 4	1 1	25%	4	Lognormai	9.00E+01	1.81E+02	3.70E+02	2.17E+03	3.70E+02
SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	4	2	50%	4	Lognormal	8.70E+01	9.18E+01	1.00E+02	NC	1.00E+02
SVOA	Benzo(b)fluoranthene	ug/kg dw	. 4	3	75%	) 4	Lognormal	9.00E+01	1.13E+02	1.40E+02	1.54E+02	1.40E+02
SVOA	Fluoranthene	ug/kg dw	4	3	75%	4	Normal	9.00E+01	1.70E+02	2.40E+02	2.50E+02	2.40E+02
SVOA	Benzo(k)fluoranthene	ug/kg dw	4	3	75%	4	Lognormal	8.20E+01	9.68E+01	1.30E+02	1.37E+02	1,30€+02
SVOA	Chrysene	ug/kg dw	4	3	75%	1 4	Lognormal	9.00E+01	1.58E+02	3.00E+02	7.34E+02	3.00E+02
SVOA	Benzo(a)pyrene	ug/kg dw	4	3	75%	1 4	Normal	4.70E+01	9.93E+01	1.40E+02	1.45E+02	1.40E+02
SVOA	Benzo(a)anthracens	ug/kg dw	4	3	75%	4	Lognormal	9.00E+01	1.04E+02	1.30E+02	1.33E+02	1.30E+02
SVOA	Phenanthrene	ug/kg dw	4	1	25%	1 4	Lognormal	9.00E+01	9.63E+01	1.10E+02	NC	1.10E+02
SVOA	Pentachlorophenol	ug/kg dw	4	1	25%	4	Normal	2.25E+02	2.32E+02	2.41E+02	2.41E+02	2.41E+02
VOA	Tetrachloroethene	ug/kg dw	4	1 1	25%	1 4	Lognormal	2.55E+00	6.73E+00	1.70E+01	2.98E+02	1.70E+01
VOA	2-Hexanone	ug/kg dw	4	1 1	25%	1	NC	5,70E+00	5.70E+00	5.70E+00	NC	5.70E+00
VOA	Carbon disuffide	ug/kg dw	4	1_1	25%	3	Normal	2.55E+00	3.42E+00	4.30E+00	4.89E+00	4.30E+00

#### Appendix C-4.5 Summary Statistics for Site I Surface Soll Sauget Area I

ł							Shapire-Willie's Yest for Hermathy(s)	Survey States			00% Upper Genfidense Limit	
Method	Constituent	Unito	Number of Samples Applying	Number of Detects	Proquency of	Humber of Samples for Statistics	Catacot Distribution	Minimum	Mean	Manheum	UCL (b)	Bite Consentration (s)
AZBOA	THE TOTAL TEQ W/ EMPC IN NO	uehe	4	4	100%	4	Lagranmal	7 734 -02	3 34E+00	1 276+01	5 ASE - 13	1 2/E + 01
HERB	2,4 DB	ug/tig dw	4	•	76%	, ,	Lognormal	4 36€ +00	1 27E+01	2 81E+01	8 37E+06	2 01E +01
METALS	Aluminum	mg/kg dw		4	100%	4	Lagnormal	3 766 + 03	5 64E+03	8 00E+03	1 04E+04	# ODE + 03
METALS	Man	mg/kg dw	1 4	•	100%	4	Normal	6 346 +03	1086+04	1 606+04	1 600:+04	1 60E +04
METALS	Lead	mg/kg dw	•	•	100%	4	Normal	3 306 • 03	9 80E + 03	1 806 +03	1 418+03	1 416+03
METALB	Magnestum	mg/ng dw	1	1	100%	•	Lognormal	7 606 +03	1.24E+04	1 905+04	2 876+04	1 SOE + 04
METALS	Marganasa	rng/kg dw	i :	<b>!</b> •	100%	4	Lagranmus	1 600:+02	7 03E+02	3 008 + 02	3 60£ +03	1 00£ +02
METALB	Marcury Melyledenum	mg/kg dw mg/kg dw	:	:	100%		( ognormal Normal	4 /66 02	0.048-01	2 00k+00	5.71E+06	3 OOF +00
METALE	Nichel	mg/kg dw	;	:	100%	;		2 /0F+00 1 456+01	1 ME +00	A 60E+00	N 107 (t + (3t)	B A(10 + (10)
METAL B	Politicium	mg/ng dw			100%	1 7	i Ognomal Lognomal	1 496 - 63	1 24E + 03	6 506 -01	4 40E+02	a but +u1
METALS	Street	make on	1 .		100%	1 2	Lagramai	1782+00	# /16 -00	1 608 403	8 / 18 • 03	1 50(:+0) 1 (40(:+0)
METALB	Nodum	mana aw	1	1	100%	[ ]	Normal	4 408 • 02	0.304 - 02	8 /OE+02	B 80£+02	# /at + 02
METALS	Antimony	mohe dw		i i	100%	l i	1 agracmust	2 80k (00	1) Unit +00	8 40£ • 00	2 (18 - 01	6. 4UE + UC
METALB	Americ	mutu av			100%	) ;	Normal	4 562 - 00	//wE+00	1 200:01	1 218-01	1 200:+01
METALS	Barrum	mg/kg dw	4	4	100%	4	Lagrarmai	N 308 +01	2 818 -02	7 408 + 02	4 078+04	/ 40# +0J
METALS	Herymun	mg/kg dw		] 4	100%		Logranial	4 MOP -01	U 10#-01	1 708 +00	4 000 = 00	1 70£ +00
METALS	Cadmium	mg/kg dw	4	4	100%	4	Lagnormal	2 206 +00	1 127 -01	3 102 401	4 578+04	3 100:01
METALS	Chromium	mg/kg dw	4	4	100%	4	Lognormal	1.302 +01	1 336 • 01	8 508 401	6 678 - 07	6 506 +01
ME TALS	Coball	mg/kg dw	•	4	100%	4	Lingnormal	2 008 +00	1216+01	3 300 + 01	1 808 104	3 30E+01
METALS	Copper	mg/ng dw	1 •	4	100%	4	Normal	1 658 + 03	0.00(:+03	1.302+04	1.348 +04	1 3GR+04
METALS	Vanadium	mg/lig riw		4	100%	} 4	Normal	1.078.+01	1478-01	2 600 +01	2 fi30 (0)	2 fior +01
METALS	7 inc	mortig dw	1 •	1	100%	1 1	f adustable	4 068+02	1.438+03	2 ROF+03	4.33(1+04	2 MOF +05
MF TAL B	Calcium	mg/kg dw	1 1	4	100%		Logocomal	0 70F +04	1 1/E • 06	2 358 +05	4 NOF + OA	7.15E+05
METALS	Selenium	mg/kg dw	! !	3	76%		Lognormal	5 500 01	1 100 +00	1 906 +00	6 R9F + 00	1.00(+00
PCB	Total PCBs	ug/lig dw	;	1 ;	78% 100%	4 3	Lognomal	6.102.401	1 178+04	1 218+05	A 78E + 28	1 215 +05
PEST	Hertachter grouide	ug/tg dw	, ,	1 :	33%	, ,	Lognormal	9.40E-01 8.60E+00	4 85E+01 8 95E+00	1 40E+02 8 BOF+00	1 51E • 26 9 60E • 00	1 40E • 07
PEST PEST	Fransullan autale Aldrin	rightig dw	( ;	( ;	100%	1 ;	Normal Logrormal	# 20E-01	H 4RF+D1	7 50E+02	2 17E+38	# #DE+(X) 2 50E+02
PEST	Findosaffan II	up/kg dw	1 ;	1 ;	100%	;	Lighternia	2 28E+00	2 DME+02	6 00E+02	3 878 +35	0.000
PEST	4.4'-001	USAS ON		l ž	67%	\ ;	Lagagemai	3 90E • 00	1 178+02	4 60€+02	1 986 - 12	4 HOF+02
PEST	Alpha Chlordane	up/kg dw	1 ;	1 7	22%	1 1	NC NC	2 86E • 90	7 95F+00	2 8AF + 00	NC.	7 85E+00
PEST	Gamma Chlordana	up/up dw	1 3	1 3	100%		Immongo	5 56E+00	1 32E+02	3 808:+02	1 186+24	3 MOE+02
PERI	Freide katone	ug/kg dw	1	5	100%	ذ ا	Lagnormal	3 20€+00	7 426 +02	7 00E • 02	1 29E+33	7 One • 02
PEBT	Dieldrin	HO/NG OW	,	1	100%	3	Lognormal	1 70E • 00	7 04E+01	2 006 • 02	6 676 + 25	2 DDE+02
PE81	Endrin	up/kg dw		1	100%	,	Lognormal	B 10E 01	N 22E+01	2 406 • 02	1 446 + 35	2 40E • 02
PEST	Methoxychior	ug/ng dw	) ,	٠,	100%	3	l ognomal	1 806+01	1 036 • 03	3 006+03	1 3/8 - 55	3 ONE +03
PEST	4,4'-000	ug/ng dw		3	100%	,	Logopomal	3 10€±01	10+399.0	2 00E+02	6 19E+66	2 00€+02
PEST	4,4'-DOE	ug/kg dw	3	3	100%	,	Lognormal	1 684 - 00	1 036 • 02	3 006 • 02	1 366 + 32	3 00€+02
PEST	Fridrin aldehyde	ug/tig dw	) ,	) ,	100%	) )	Lagnormal	4 706+00	9 186+03	1 600 +03	A 90€ • 37	1 606+03
PEST	Heptachior	ug/kg dw	1 2	2	67%	, ,	Logoormal	A 96E-01	2 496+01	6 906 + 01	3 916 - 21	0 00E+01
PEST	Endosulfan I	ug/kg dw	3	,	100%	3	Lagnormul	7 206-01	# BBE+01	2 60E+02	6.218+36	2 80#+02
SVOA	1,4:Dichlorobenzene	ug/ng dw	1 4	! !	25%	! !	NC NC	4 606+01	4 602 • 01	4 806 •01	NC	4 60€+01
BVOA	4-Chlorganitine	ug/lig dw	! !	2	60%	4	Lognormal	1 656+03	4 646 • 03	1 80€+04	3 36€ + 16	1 60€+04
SVOA	bis(2-Ethythaxyt)phthalate	ug/kg dw	!	1 !	26%	1 1	NC Language	8 75E+01 3 83E+01	8 75E+01 5 48E+01	8 75E+01 1 10E+02	NC 2 925 + 02	N 76E+01 1 10E+02
SVOA SVOA	Hexachlorobanzana Anthracena	ug/kg dw	1 :	;	80%	1 :	Lognormal Lognormal	2 86E+01	2 366+02	7 308 +02	3 376+06	7 30€+02
SVOA	f.2.4-Trichtorobenzens	ug/kg dw	1 7	1 :	26%	1 2	Lognormai	6 50E+01	1 116+02	1 605 + 02	2 365+02	1 80€+02
SVOA	2,4-Dichlorophenol	ug/kg dw	1 7	1 i	25%	1 1	NC NC	8 200 +01	8 208+01	8 20E + 01	NC NC	8 20E+01
SVOA	Pyrene	up/kg dw	1 7	1 4	100%	1 4	Lognormal	1 40€+02	1 35E+03	4.70E+03	1 145 +00	4 70€+03
SVOA	Dibenzoluran	up/ng dw		1 ,	25%	4	Normal	8 60E+01	9 25E+01	1 005+02	1 00E+02	1 00€+02
SVOA	Benzo(g,h,i)perylene	up/kg dw	1	1	75%	ı Ă	Lognormal	9 000 +01	4 66E+02	1 60E+03	5 62E+06	1.60E+03
BVOA	indeno(1,2,3-ad)pyrene	ug/kg dw	1	2	50%	1	Lognormal	9 005+01	4 64E+02	1 60E+03	7 84E+06	1.60€+03
SVOA	Benzo(b)fluoranthene	ug/kg dw	1 4	3	75%	1	Lognomial	9 50E+01	8 14E+02	2.80E+03	4.06E+06	2.80€+03
SVOA	Fluoranthene	ug/kg dw	4	4	100%	4	Lognormal	1 20E+02	1.66E+03	6 00E+03	2 32E+10	6 00E+03
SVOA	Benzo(k)fluoranthene	ug/kg dw	4	3	75%	4	Lognormal	5.50E+01	3.10E+02	9.50E+02	1 05E+06	9 60E+02
SVOA	Chrysene	ug/ig dw	4	) 3	75%	1 4	Lognormal	9.50E+01	6.62E+02	2.20E+03	5.53E+07	2.20E+03
SVOA	Senzo(a)pyrane	ug/lig dw	1 4	3	75%	1 4	Lognormal	4.95E+01	6 29€+02	2 20€+03	2 97E+09	2 20E+03
SVOA	Dibenzo(a,h)enthracene	ug/kg dw	14	2	50%	4	Lognormal	3.66E+01	1.23E+02	3.60E+02	4.44E+04	3.60E+02

#### Appendix C-4.5 Summary Statistics for Site I Surface Soll Sauget Area I

							Shapiro-Wilke's Test for Normality(a)	Summary Statistics			95% Upper Confidence Limit	٠.
Method	Constituent	Units .	Number of Samples Analyzed		Frequency of Detection	Number of Samples for Statistics	Dataset Distribution	Minimum	Mean	Maximum	UCL (b)	Site Concentration (c)
SVOA	Benzo(a)anthracene	ug/kg dw	4	3	75%	4	Lognormal	7.80E+01	6.53E+02	2.20E+03	1.36E+08	2.20E+03
SVOA	Di-n-butylphthalate	ug/kg dw	4	1	25%	1	NC	5.20E+01	5.20E+01	5.20E+01	NC	5.20E+01
SVOA	Phenanthrene	ug/kg dw	4	4	100%	4	Lognormal	5.00E+01	8.80E+02	3.30E+03	3.21E+11	3.30E+03
SVOA	Fluorene	ug/kg dw	4	1	25%	4	Lognormal	8.50E+01	1.25E+02	2.30E+02	4.33E+02	2.30E+02
SVOA	Carbazole	ug/kg dw	4	1	25%	4	Lognormal	8.50E+01	1.48E+02	3.20E+02	1.30E+03	3.20E+02
SVOA	Pentachlorophenol	ug/kg dw	4	4	100%	4	Lognormal	2.20E+02	6.34E+02	1.65E+03	6.33E+04	1.65E+03
SVOA	2-Nitroaniline	ug/kg dw	4	1	25%	1	NC NC	1.60E+02	1.60E+02	1.60E+02	NC	1.60E+02
VOA	Toluene	ug/kg dw	4	1 1	25%	4	Normal	2.35E+00	2.89E+00	3.30E+00	3.39E+00	3.30E+00

Appendix C-4.8 Summary Statistics for SNe L Surface Soll Sauget Area I

							Shapire-Willie's Tool for Hormality(a)		mery Bretterin	·	90% Upper Confidence Limb	
Method	Genetituess	Unite	Tompton American	Number of	Proguency of	Complete for	Dotabut Distribution	Meimum	Moon	Mandanga ;	UOL (M)	Min Concentration (4)
AZROA	1666 TOLN TEQ W EMPC M NO	ughg	4	4	100%	4	Lagnormal	9 32E 02	3 60E 01	# 21E-01	1 26E+02	6.21E-01
METALB	Cyanada, Total	mo/ng dw	•	1	25%	4	Lognormal	2 70€-01	6 06E-01	1 005+00	3 006 +01	1 40E+00
METALS	Aluminum	mg/hg dw	4	4	100%	4	Normal	3 60£ +03	6 76E+03	7 606 + 03	7 465 - 03	7 60€ +03
METALS	Iran	mg/ng dw	۱ ،	•	100%	•	Nomal	7 10€+03	2 10E+04	3 205 + 04	3 616+04	3 20E +04
METALS	Lead	mg/kg dw	٠ .	•	100%		Lognormal	8 40E +01	3 NuE+02	9 40E+02	2 64€ +06	9 40E + 02
METALB	Magnesium	mg/ng ow	•	4	100%	4	Normal	3 40£+02	2 49E+03	4 20E+Q3	4 466 +03	4 20€ +03
METALS	Marganese	mg/ng dw	•	4	100%	4	Nomat	2 XXF +01	3 h18 +02	6 50E+02	6 766 • 02	4 htt: +02
METALE	Mercury	waye an	•	•	100%	◆	Numbel	3 MOE (12	37/E 01	5 BUE OI	1 /4E 01	function of
METAL 8	Aleightillanum	marks the	1 1	( •	100%	4	Lognomal	W 3K3E+00	1400-01	2 MF+01	4 2MÉ + 01	7 30E+01
METALE	Nichal	wayes an	١ •	4	100%	•	Normal	1 86年 + 01	4 nmt +01	5 50E+01	ስ የሐር • በነ	5 bat +01
METALE	Polaeeum	mang aw	٠ .	4	100%	4	Normal	6 (KOR + CL)	1.09001-03	1 /00:+03	1 686 +03	1 666 + 03
METALB	liaver	mg/tig dw			76%	4	Lognomial	6 60¢ 01	# 13¢ Q1	1 202+00	1 57€+00	1 200: 00
METALE	Nexthurn	mohe dw	•	•	100%	•	1 agnormal	) int+0)	3 400=103	6 40E+02	1 (Neft + (2))	5 40E+02
METALE	Ehallium Antimony	mg/ng dw	1 :	1 :	100%		Neumal	1 60€ +00	) #/\t =00	2 106 +00	2 046 +00	2 00E +00
		mg/kg dw	:	1 :	100%	4	(Lagrama)	7 ONE+00	1 2MF+00	6.400 +00	R 8AR+00	ñ.40#:+002
METALS METALS	Artenio Natum	mg/ng dw	:		100%	1 ~	Lagnormal	3 000 +01	1 135 101	3 700 (0)	NC .	3 700:+01
METALB	Herytigen	mg/kg dw mg/kg dw	;		100%	:	Normal	6 300: ±01 1 400: ±00	1 /11:02	7 500 107	2 HMB +02	3 608 (03
METALS	Cadmium	mo/ng ow	;	1 :	100%		Lagnormal		1 480 +(00)	1 60#+00	NC .	1 400 +00
METALS	Chromium	maye aw	1 :	1 :	100%	1 :	Normal	7 10F 01 1 70F • 01	1 100 100	1.007+01	1 02#+01	100#+01
METALB	Cobat	make ow	} :		100%	١ :	Lognomal	1 100 01	1 387 - 01	7 902 + 01 1 700 + 01	4 498 +02	7 90/ +01
METALS	Copper	mo/hg dw	;	1 :	100%	;	Lagnannel Lagnannel	1 90F + 02	1 707 - 03	4 702 • 03	1 00F+01 7 41E+07	1 700 +01
METALS	Vanidium	mg/kg dw	1 :	1 7	100%	1 7	Lognomai	1 907 +01	4 4 17 + 01	4 907 101	7 10E+01	4 702 +03
METALS	Zinc	me/he dw			100%	l :	Normal	1 606 +02	5 10F + 02	8 70P + 02	# #1E+02	4 90F +01
MF TALS	Calcium	me/he dw			100%	٠.	Normal	7 MOF + 03	2 00F +04	2 005 • 04	1428+04	# 61€+02 2 90€+04
METALS	Selenturn	mg/hg dw	1	1 .	100%	1 7	Logramal	1 80€ 100	1001:00	4 TOE + 00	9.008+00	4 30E+00
PCB	Total PCBs	ing/hg dw	1	] ;	50%		Normal	9.00€ • 00	4 90F + 02	1 1/8 • 03	1 07F • 03	1 070 +03
PEST	Heepfactition apposition	HQ/NG dw	1 4		75%	1 7	Normal	0.006.01	5 85E+00	9.20€+00	1 058 • 01	9.20€+00
PEST	Aitin	up/lig dw	1	i	25%	1 4	Normal	9.00E-01	1 83E • 00	5 50E+00	6 19E+00	1 50€ ±00
PEST	bets MAC	HD/ND dw	4	l ,	25%	4	Lognomal	2 50E-01	1 BAE + 00	3 70E+00	1 308 + 03	1 /DE+00
PEBT	4.4'-DD1	HD/ND (NV	( •	( )	29%	(	Normal	1 ROE +00	R WE LOO	1 90€ • 01	1 5ME+01	1 NRE+01
PEBI	Gamma Chlordane	up/to the		,	78%	1 4	Acceptable	9.00E-01	1 155 - 01	2 10€+01	2 13E+01	2 10E+01
PEST	Emilin kelone	HD/ND dw	4	1	75%	4	Immorago J	I NOE + OO	1.23E+01	2 80E+01	1 236+04	2 80E+01
PEST	Dieldrin	אים פאימנו	4	1	26%	4	Normal	1 HOE + 00	7 M3E+00	1 20€+01	1 296 + 01	1 206 • 01
PEST	Methos yohige	ug/kg dw	4	2	90%	,	Normal	# DOE +OD	2 83E+01	4 NOE+01	6 77E+01	4 RDE+01
PEST	4,41,008	HOMO dw	4	3	75%	4	Normal	/ MUE +00	1.10€+01	3 00E+01	1 978+01	1 076 • 01
BVOA	tila (2- F thythex yt) philippide	ug/kg ow	4	2	80%	4	Lognormal	9 00E+01	1 00E+02	3 10E+02	1 00E+02	3 10E+02
BVOA	Anthracene	ug/kg dw	4	3	75%	4	Lagnormal	9 00E+01	1 0AE+03	3 60£+03	P 95E+08	7 80€ +00
BVOA	Pyrane	ug/hg dw	4	3	78%	4	Lognormal	9 00E+01	4 27E + 03	1 306 +04	4 MBE • 13	1 308+04
SVOA	pheniofuran	ug/ng dw	4	١ ١	25%	4	Lognormal	B-006+01	2 86E+02	7 606+02	# 24E+04	7 80E +02
BVOA	Bento(g.h.i)perylene	שלי קוליקנו		,	75%	} •	Lognormal	9 000 • 01	י כסי שנני ו	3 NOE +03	1 14E+00	2 MOE + 03
SVOA	indunn(1,2,3-cd)pyrana	ug/ng dw	4	1	75%	4	Lognormal	9 00E+01	1 88E + 03	4 805 +03	7 51E+09	4 806 +03
SVOA	Senzo(b)fluoranthene	ug/ng dw	4	,	76%	4	Lognormal	# 00€+01	2 19€+03	6 60E+03	7 028 + 10	6 60€ • 03
SVOA	f kinfanthene	ug/tg dw	4	3	76%	4	lagnomal	9 00E+01	8 77E+03	1 NOE+04	1 676+15	1 805+04
SVQA	(kenzo(k)fixoranthene	Hg/fig dw	4		75%	4	Lognormal	9 00€+01	2 29E+03	6 405 +03	2 12E+11	4 NOE+03
SVOA	Chrysens	ug/ng dw	1 1	3	76%	4	Lognormal	9 005+01	2 64E+03	7 806 +03	3 67E+11	7 806+03
BVOA	Bonzo(a)pyrene	ug/to dw	1 1	;	76%	1 1	Lognormal	4 90€+01	2 306 +03	7 00E+03	3 488+13	7 00€+03
SVOA	Diberzo(A,h)anthracene	ug/lig dw	1 !	2	50%	1 1	Lagnormal	4 906+01	4 66E+02	1 30E+03	5 84E+08	1 30€+03
BVOA	Benzo(a)anthracene	ug/lg dw	1 !	1 3	76%	1 :	Lognormal	9.002+01	2 56E+03	7 80E+03	3 265+11	7 80€+03
8VOA	Acenaphthene	ug/kg dw	4	2	50%	1 :	Lognormal	9 002 • 01	4 816+02	1 60E+03	8 49E+08	1 60E+03
SVOA	Phenanthrene	ug/lig dw	! !	!	75%	! !	Lognormal	9 002+01	3 62E+03	1 20E+04	7 19E+12	1.20E+04
8VOA	Fluorene	ug/kg dw	( :	1 3	50%	( :	Lagnormal	9.00E+01	4 21E+02 4 80E+02	1 40E+03	8 22E+08 1 62E+08	1 40E+03 1 50E+03
SVOA	Carbazole	ug/kg dw	! !	3	76%	1 :	Lognormal					
SVOA	Pertachiorophenoi	ug/kg dw	! !	1 !	25% 25%	3	Nomal	2.35E+02 9.00E+01	2 38E+02 1 49E+02	2 40E+02 3.20E+02	2.43E+02 1.22E+03	2 40E+02 3 20E+02
SVOA	Naphthalene	ug/kg dw	:	:	25%	:	Lognormal	9.00E+01	1 04E+02	1.40E+02	1 22E+03 1 47E+02	1 40E+02
SVOA	2-Methylnaphthalene Toluene	ug/kg dw ug/kg dw	1 :	1 :	25%	1 :	Lognormai Lognormai	3 15E+00	6 08E+00	1.30E+01	6 23E+01	1 40E+02 1 30E+01

### Appendix C-4.7 Summary Statistics for Site N Surface Soil Sauget Area I

			1								·	<del></del> -
					ļ		Shapiro-Wilke's Test for Normality(a)	Sun	wnary Statistic	:6	95% Upper Confidence Limit	
Method	Constituent	Units	Number of Samples Analyzed	Number of Detects	Frequency of Detection	Number of Samples for Statistics	Dataset Distribution	Minimum	Miran	Maximum	UCL (b)	Site Concentration (c)
8280A	1998 Total TEQ w/ EMPC as ND	ug/kg	4	4	100%	4	Lognormal	3.90E-03	9.76E-02	3.45E-01	2.91E+07	3.45E-01
METALS	Aluminum	mg/kg dw	4	4	100%	4	Lognormal	7.50E+03	8.75E+03	1.10E+04	1.14E+04	1,10E+04
METALS	Iron	mg/kg dw	4	4	100%	4	Normal	1.30E+04	1.43E+04	1.50E+04	1.54E+04	1.50E+04
METALS	Lead	mg/kg dw	4	4	100%	4	Lognormal	1.90E+01	1.38E+02	4.10E+02	5.63E+06	4.10E+02
METALS	Magnesium	mg/kg dw	} 4	4	100%	4	Lognormal	5.20E+03	7.18E+03	1.15E+04	1.59E+04	1.15E+04
METALS	Manganese	mg/kg dw	4	4	100%	4	Normal	2.80E+02	3.74E+02	4.10E+02	4.47E+02	4.10E+02
METALS	Mercury	mg/kg dw	4	4	100%	4	Lognormal	3.10E-02	6.78E-02	9.50E-02	3.52E-01	9.50E-02
METALS	Molybdenum	mg/kg dw	4	4	100%	4	Lognormal	7.00E-01	1.03E+00	1.45E+00	1.82E+00	1.45E+00
METALS	Nickel	mg/kg dw	4	4	100%	4	Normal	1.50E+01	1.61E+01	1.70E+01	1.71E+01	1.70E+01
METALS	Potassium	mg/kg dw	4	4	100%	4	Normal	1.20E+03	1.40E+03	1.60E+03	1.61E+03	1.60E+03
METALS	Antimony	mg/kg dw	4	] 1	25%	1 1	NC .	7.10E-01	7.10E-01	7.10E-01	NC	7.10E-01
METALS	Arsenic	mg/kg dw	4	4	100%	4	Lognormal	5.50E+00	6.33E+00	7.30E+00	7.47E+00	7.30E+00
METALS	Barlum	mg/kg dw	4	4	100%	4	Normal	1.40E+02	5.93E+02	1.20E+03	1.21E+03	1,20E+03
METALS	Cadmium	mg/kg dw	4	4	100%	j 4	Lognormal	3.00E-01	8.46E-01	1.50E+00	1.18E+01	1.50E+00
METALS	Chromium	mg/kg dw	4	4	100%	4	Lognormal	1.20E+01	1.65E+01	1.80E+01	2.29E+01	1.80E+01
METALS	Cobaft	mg/kg dw	4	4	100%	4	Lognormal	5.60E+00	5.84E+00	6.15E+00	NC I	6.15E+00
METALS	Copper	mg/kg dw	4	4	100%	4	Lognormal	1.60E+01	5.01E+01	1.10E+02	2.28E+03	1.10E+02
METALS	Vanadium	mg/kg dw	4	4	100%	4	Lognormal	2.10E+01	2.38E+01	2.90E+01	2.94E+01	2.90E+01
METALS	Zinc	mg/kg dw	4	4	100%	4	Normal	6.20E+01	1.49E+02	2.50E+02	2.61E+02	2.50E+02
METALS	Calcium	mg/kg dw	. 4	4	100%	4	Lognormal	1.60E+04	5.73E+04	1.09E+05	1.99E+06	1.09E+05
METALS	Selenium	mg/kg dw	4	1	25%	4	Lognormal	4.95E-01	5.69E-01	6.80E-01	6,91E-01	6.80E-01
PCB	Total PCBs	ug/kg dw	4	1 1	25%	4	Lognormal	9.00E+00	5.13E+01	1.78E+02	5.08E+08	1.78E+02
PEST	Aldrin	ug/kg dw	4	1	25%	3	Normal	9.00E-01	1.03E+00	1.28E+00	1.39E+00	1.28E+00
PEST	beta-BHC	ug/kg dw	4	1	25%	3	Lognormal	2.70E-01	2.93E-01	3.38E-01	3.82E-01	3.38E-01
PEST	4.4'-DDT	ug/kg dw	4	1	25%	4	Lognormal	1.75E+00	2.02E+00	2.70E+00	2.82E+00	2.70E+00
PEST	Alpha Chlordane	ug/kg dw	4	1	25%	3	Normal	9.00E-01	9.67E-01	1.10E+00	1.16E+00	1.10E+00
PEST	Gamma Chlordane	ug/kg dw	4	1	25%	4	Lognormal	9.00E-01	1,38E+00	1.85E+00	3.73E+00	1.85E+00
PEST	Dieldrin	ug/kg dw	1 4	1 1	25%	3	Lognormal	1.75E+00	1.89E+00	2.13E+00	2.33E+00	2.13E+00
PEST	Methoxychlor	ug/kg dw	4	1	25%	4	Lognormal	9.00E+00	2.08E+01	5.50E+01	1.40E+03	5.50E+01
SVOA	bis(2-Ethylhexyl)phthalate	ug/kg dw	4	1	25%	1 4	Lognormal	9.00E+01	1.01E+02	1,30E+02	1.33E+02	1.30E+02
SVOA	Anthracene	ug/kg dw	4	3	75%	3	Normal	3.60E+01	4.70E+01	5.80E+01	6.55E+01	5.80E+01
SVOA	Pyrene	ug/kg dw	4	4	100%	4	Normal	1.50E+02	3.41E+02	5.50E+02	5.51E+02	5.50E+02
SVOA	Benzo(g,h,l)perylene	ug/kg dw	4	1	25%	4	Lognormal	9.00E+01	1.44E+02	3.00E+02	9.66E+02	3.00E+02
SVOA	Indeno(1,2,3-cd)pyrene	ug/kg dw	4	3	75%	4	Lognormal	8.75E+01	1,44E+02	2.50E+02	5.70E+02	2.50E+02
SVOA	Benzo(b)fluoranthene	ug/kg dw	4	4	100%	4	Lognormal	5.90E+01	1.65E+02	3.20E+02	3,55E+03	3.20E+02
SVOA	Fluoranthene	ug/kg dw	4	4	100%	4	Normal	1.70E+02	3.93E+02	6.10E+02	6.27E+02	6.10E+02
SVOA	Benzo(k)fluoranthene	ug/kg dw	4	4	100%	4	Normal	8.00E+01	2.18E+02	3.80E+02	3.70€+02	3.80E+02
SVOA	Chrysene	ug/kg dw	4	4	100%	4	Lognormal	8.80E+01	2.00E+02	3.10E+02	1.43E+03	3.10E+02
SVOA	Benzo(a)pyrene	ug/kg dw	4	4	100%	4	Lognormal	7.20E+01	1.87E+02	3.30E+02	2.74E+03	3.30E+02
SVOA	Dibenzo(a,h)anthracene	ug/kg dw	1 4	2	50%	4	Normal	4.90E+01	7.25E+01	1.10E+02	1.07E+02	1,07E+02
SVOA	Benzo(a)anthracene	ug/kg dw	1 4	4	100%	4	Normal	7.00E+01	1.68E+02	2.70E+02	2.77E+02	2.70E+02
SVOA	Phenanthrene	ug/kg dw	4	4	100%	1 4	Normal	8.00E+01	1.78E+02	2.60E+02	2.63E+02	2.60E+02
SVOA	Pentachlorophenol	ug/kg dw	1 4	1 4	100%	4	Lognormal	2.32E+02	3.07E+02	4.74E+02	6.13E+02	4.74E+02

#### Appendix C-4.8 Summary Statistics for Site G Subsurface Soil Sauget Area I

		<b>1 da</b>					
		Shapiro-Willia's Test for				99% UCL	
		Hormality	Sure	y Statistics	(mp/lgg)	(mg/kg)	
•							
						1	
	Number of						
	Samples for	Dataset			NO	l	Site Concentration
Constituted	Statistics (a)	Distribution	Minimum	Mean	5 81E-01	ucı_	Portal
1,1,2,2-Tetrachloroshane 1,2,4-Trichlorobertzene	4	NC Lognome	5.81E-01 7.87E+00	5.81E-01 6.16E+01	1.20E+02	NC 2.19E+05	5.81E-01 1.20E+02
12-Octionerane	•	NC	4.35E-11	4.35E-01	4.35E-01	NC	4.35E-01
1,4-Octionobercane	2	Lognormal	2.38E+00	2 97E+00	3.56E+00	NC	3.56E+00
2.4 6-Tinchloropherol 2.4-Octrioropherol	3	NC Lognormal	4 95E+01 :	4 95E+01 6 45E+01	4.95E+01 1.41E+02	NC 517E+07	4.95E+01 1.41E+02
2.4-Ombropheral		NC	140E-01	1.40E+01	1 40E+01	NC	1 40E+01
2-Butanone (MEX)	7.	Nome	2.20E-02	7 39E+00	1 78E+01	1.08E+01	1.08E+01
2-Oniorophenol 2-Methylnephalene	4	NC	8.76E+00 8.71E+00	8.76E+00 1.84E+01	8.75E+00 3.71E+01	NC 1.04E+02	8.76E+00 3.71E+01
2-Methylphenolio-cresol)	;	Lognormal NC	3 56E+00	3 56€+00	3.56E+00	NC NC	3.56E+00
4 4-00E	4	Lognarmer	3 C7E+00	4 50E+01	1.35E+02	1.85E+08	1.35E+02
4-Ontoroamline		Lograme	5 97E-00	8.16E+01	2.31E+02	4 20E+22	2.31E+02
4-Methyl-2-pantanone Acanaphane	:	Lognormal NC	6.35E-01 2.67E+00	2 99E+00 2 67E+00	6 00E+00 2 57E+00	5.54E+02 NC	6.00E+00 2.67E+00
Acetore		Nome	3.20E-02	5 66E+00	1 54E+01	8 44E+00	8.44E+00
Alluminum		Nome	9 66E+02	8 17E+03	1 87E+04	1.08E+04	1.08E+04
Amthracene Americ	5	MC Lagrames	8 49E+00 2 50E+00	8 49E+00 5 52E+00	8 49E+00 1 11E+01	NC 1.37E+01	8.49E+00 1.11E+01
Banum		Lognorma	1 17E+02	5 00E+03	4.59E+04	4.18E-04	4.18E+04
Benzare		Nome	3 00E-03	1 53E+01	4 53E+01	2.55E+01	4.53E+01
Berzy acord		NC NC	6 10E+00 2.33E+01	6 10E+00   2 338E+01	6 10E+00 2.33E+01	NC NC	6 10E+00 2.33E+01
Bully benzy chthelate Pentachloropheno(PCP)	5	Lograme	2.35E+01	32E+03	4 77E+03	3.34E+07	4 77E+03
Сазтил	3	Dan.a	2 30E+00	7 00E+00	1.40E+01	6 65E+04	1 40E+01
Calcum	_ 1	Lognomei	* 61E+34	173E+04	1.85E+04	NC	1.85E+04
Onlorobenzene Onloroberri		Lognormal NC	1 07E-01	1.08E+02	5.38E+02 1.16E+01	1 18E+06	5.38E+02 1 16E+01
Chomun		Logramei	5 00E+00	9.36E+01	9.85E+02	2.28E+02	2.29E+02
Omysene	_ 1	NC	2.29E+01	2.29E+01	2.29E+01	NC .	2.29E+01
Cobst Copper	6	Lagnorme	8 00E+00	2 05E+01 : 1 73E+02 i	5 60E+01 2.22E+03	5.25E+01 3.24E+02	5.60E+01 3.24E+02
D-N-outy or treate		Lognome Lognome	2.79E-01	8 92E-00	1 75E+01	2 10E+11	1.76E+01
Dipenduran	2 [1	Nome	4 30E-00	1.91E+01	3.38E+01	1 12E+02	3.38E+01
Delhybritaliste Ethyberisme		MC Lognormal	2.29E+0* 1 64E-01	2.29E+01   6.80E+00	2.29E+01 1.69E+01	NC 7.35E+03	2.29E+01 1.69E+01
Fluorentere		NC	6.59E+00	6.59E+00	5.59E+00	NC NC	6.59E+00
Fluore	. )	NC .	1 13E+01	1 13E+01	1 13E+01	NC	1.13E+01
Helachlorobenzene		Lognarme	2.79E+01	3.43E+01	4 DSE+01	NC	4.06E+01
Lead	_ 1	Lognormal Lognormal	4 06E+03 3 00E+00	1.35E+04   2.41E+02	5.37E+04 3.12E+03	1.73E+04 7.30E+02	1.73E+04 7.30E+02
Magnesum			7 16E+03	7.31E+03	7 46E+03	NC	7 46E+G3
Manganese	i	Normai	4.30E+01	2 09E+02	4 51E+02	2.75E+02	2.75E+02
Mercury Methylene chloride		Lograme	2.00E-02 3.00E-03	8 66E+00	3.43E+01 7.11E+00	3.78E+21 4.29E+03	3.43E+01 7.11E+00
N Nicosodiphenylemne		Lognomes NC	178E+02	1 78E+02	1 78E+02	NC NC	1.78E+02
Naphalane	7	Lognomei	4.83E+00	8 93E+02	5 43E+03	9.78E+06	5.43E+03
McHai	. 5	ogramer	6 00E+00	5 13E+01	3 99€+02	7.96E+01	7.98E+01
Physicistrane Phanci		Lognormal NC	1.29E+0* 1.78E+02	2 84E+01 1 78E+02	5 14E+01 1 78E+02	1 18E+02 NC	5.14E+01 1.78E+02
Proprova	. )	Lognome	1 83E+C2	5 37E+02	1.34E+03	1.98E+02	8.98E+02
Pozassum	Z	Nome	1 47E+03	1 59E+03	1 70E+03	2.31E+03	1 70E+03
Pyrene Silver		Logromei	7.56E+00	1 33E+01	1.91E+01 1.20E+01	NC NC	1.91E+01 1.20E+01
Total PCbs		NC Lagnormei	1.20E+01 1.30E-01	1.20E+01 9.08E+02	4 43E+03	NC 6.93E+16	1.20E+01 4.43E+03
Testachiorosthene	8 1	Nomel	9 00E-03	1.88E+01	5.86E+01	3.30E+01	3.30E+01
Tun		Lognomei	2 60E +01	5.30E+01	8 00E+01	NC	8.00E+01
Total Tylenes		*********	4 06E-01 9 20E-02	4 85E+01 1 64E+01	1 18E+02 4 15E+01	8.71E+01 1.36E+06	1 18E-02 4 15E-01
Inchiorathere	1	.ograme	7 62E-0*	1 94E+00	3.85E-00	1.85E+C1	3.85E+00
Variedum		agrome	40E+C:	1.49E+02	1 32E+03	4 44E+02	4 44E+02
Zinc		ograme	2 70E-C1	4 75E+02	4.25E+03	1 02E+03	1 02E+03
trans-1,2-Ochioroshene		to the interaction we	7 00E-01	7 00E-01	7.00E-01	NC_	7 00E-01

ta) - Only concentrations reported as detected by the laboratory were used in this calculation of statistics for subsurface soil.

#### Appendix C-4.9 Summary Statistics for Site H Subsurface Soll Sauget Area I

		Shapiro-Wilke's Test for Normality	Summ	ary Statistics	(mg/kg)	95% UCL (mg/kg)	
							·
	·		i .	i i	1		
Constituent	Number of Samples for Statistics (a)		Minimum	Mean	Maximum	UCL	Site Concentration (mg/kg)
1,2,4-Trichlorobenzene	6	Lognormal	6.10E-02	1.33E+03	7.58E+03	4.42E+22	7.58E+03
1,2-Dichlorobenzene 1,2-Dichloroethane	3 1	Lognormal NC	5.48E-01	6.48E+03 1.20E-02	1.94E+04 1.20E-02	1.38E+134 NC	1.94E+04 1.20E-02
1,3-Dichlorobenzene	3	Lognormal	1.20E-02 7.65E+00	8.76E+01	2.42E+02	1.28E+17	1.20E-02 2.42E+02
1.4-Dichlorobenzene	5	Lognormal	6.20E-02	6.32E+03	3.06E+04	8.14E+38	3.06E+04
2,4,6-Trichlorophenol	2	NC	1.79E-01	3.07E+02	6.13E+02	NC	6.13E+02
2,4-Dichlorophenol	5	Lognormai	1.67E-01	1.50E+02	7.42E+02	2.30E+17	7.42E+02
2,4-Dimethylphenol	1	NC	9.20E-02	9.20E-02	9.20E-02	NC	9.20E-02
2-Butanone (MEK)	5 3	Normal	3.30E-02	1.26E+01	2.72E+01	2.51E+01	2.72E+01
2-Methylnapthalene 4,4'-DDE	2	Lognormal Normal	1.56E-01 5.04E-01	1.16E+02 6.42E-01	3.47E+02 7.80E-01	1.00E+82 1.51E+00	3.47E+02 7.80E-01
4,4'-DDE 4,4'-DDT	2	Nomal	7.80E-01	8.52E-01	9.23E-01	1.30E+00	9.23E-01
4-4'-DDD	1	NC	4.31E-01	4.31E-01	4.31E-01	NC NC	4.31E-01
4-Methyl-2-pentanone	4	Lognormat	9.00E-03	2.33E+00	7.85E+00	1.90E+15	7.85E+00
4-Methylphenol	1	NC	1.72E-01	1.72E-01	1.72E-01	NC	1.72E-01
4-Nitroaniline	1	NC	1.83E+03	1.83E+03	1.83E+03	NC	1.83E+03
Acenapthylene	3	Lognormal	1.30E-01	1.26E+02	3.78E+02	4.03E+84	3.78E+02
Acetone	11	Lognormal	1.50E-02	4.85E+00	2.11E+01	1.58E+03	2.11E+01
Aluminum Anthracene	11	Lognormal	4.50E+02	3.85E+03	1.21E+04	1.08E+04	1.08E+04
Anthracene Arsenic	4 2	Lognormal NC	1.29E-01 3.00E+00	1.70E+02 1.45E+01	6.80E+02 2.60E+01	1.80E+34   NC	6.80E+02 2.60E+01
Barium	11	Lognormal	3.80E+01	6.05E+02	3.24E+03	5.87E+03	3.24E+03
Benzene	7	Lognormal	4.00E-03	1.52E+01	6.13E+01	1.27E+12	6.13E+01
Benzo(a)anthracene	3	Lognormal	5.54E-01	1.26E+02	3.78E+02	9.26E+60	3.78E+02
Benzo(a)pyrene	2	NC	7.80E-01	1.36E+02	2.72E+02	NC	2.72E+02
Benzo(b)fluoranthene		Lognormal	4.42E-01	7.10E+01	2.11E+02	1.37E+50	2.11E+02
Benzo(g,h,l)perylene		NC	4.94E-01	5.69E+01	1.13E+02	NC .	1.13E+02
Benzoic acid		Lognormal	1.41E+00	2.02E+00	2.64E+00	NC	2.64E+00
Benzyl alcohol		NC	7.92E+00	7.92E+00	7.92E+00	NC NC	7.92E+00
Cadmium Chlorobenzene	4	Normal	5.00E+00 2.40E-02	1.88E+02 9.76E+01	2.94E+02 4.52E+02	3.36E+02 2.94E+17	2.94E+02 4.52E+02
Chloroform		Lognormal Normal	5.30E-02	1.23E-01	1.92E-01	5.61E-01	1.92E-01
Chromium		Lognormal	4.00E+00	4.21E+01	1.00E+02	6.37E+02	1.00E+02
Chrysene	1	Lognormal	7.50E-01	1.12E+02	3.32E+02	5.95E+47	3.32E+02
Cobalt		Lognormal	3.00E+00	3.64E+01	1.05E+02	7.44E+03	1.05E+02
Copper		Lognormal	3.00E+00	5.36E+02	2.44E+03	1.74E+06	2.44E+03
Cyanide		NC	2.00E+00	2.00E+00	2.00E+00	NC ,	2.00E+00
Di-N-butyl phthalate		Lognormal	3.43E-01	4.03E+00	2.57E+01	2.84E+01	2.57E+01
Dibenofuran		Lognormal	1.43E-01	1.55E+01	6.04E+01	2.26E+15	6.04E+01
Dibenzo(a,h)anthracene		NC	3.17E+01	3.17E+01	3.17E+01	NC 4 SPE - C4	3.17E+01
Ethylbenzene Fluoranthene		Normal Loonormal	4.38E+00 1.45E-01	9.06E+00 3.33E+02	1.28E+01 1.33E+03	1.63E+01 8.60E+34	1.28E+01 1.33E+03
Fluorantnene		Lognormal Lognormal	2.47E-01	1.61E+02	1.33E+03 4.83E+02	7.75E+78	4.83E+02
lexachlorobenzene		NC	7.14E-01	7.14E-01	7.14E-01	NC NC	7.14E-01
deno(1,2,3-cd)pyrene		NC I	1.36E+02	1,36E+02	1.36E+02	NC	1.36E+02
ron i i i i i i i i i i i i i i i i i i i	11	Lognormal	5.10E+02	2.32E+04	8.45E+04	4.98E+05	8.45E+04
ead		NC	4.00E+00	5.77E+02	1.15E+03	NC	1.15E+03
Manganese		Lognormai	7.00E+00	3.86E+03	3.65E+04	2.74E+06	3.65E+04
Mercury		Lognormal	8.00E-01	2.03E+00	3.90E+00	1.78E+03	3.90E+00
Methylene chloride		Lognormal	6.00E-03	6.34E+00	5.56E+01	8.47E+03	5.56E+01
I-Nitrosodiphenylamine lapthalene		NC	1.00E-07	1.00E-07	1.00E-07	NC 1.59E+44	1.00E-07 2.27E+03
lickel		Lognormal Lognormal	4.40E-02 4.00E+00	5.67E+02 1.77E+03	2.27E+03 1.51E+04	3.57E+06	1.51E+04
Phenanthrene		Lognormal	4.70E-02	3.53E+02	2.11E+03	3.01E+14	2.11E+03
Phenol		NC I	4.22E-01	4.22E-01	4.22E-01	NC	4.22E-01
ryrene		Lognormal	9.35E-01	2.22E+02	6.64E+02	5.05E+63	6.64E+02
Selenium	1 (1	NC	2.00E+00	2.00E+00	2.00E+00	NC	2.00E+00
lilver		Lognormal	9.00E+00	2.65E+01	4.40E+01	NC	4.40E+01
otal PCBs		Lognormal	2.51E-01	2.73E+03	1.80E+04	5.45E+15	1.80E+04
etrachloroethene		NC	5.65E+00	5.65E+00	5.6SE+00	NC NC	5.65E+00
hallium	1	NC conomal	1.00E+00	1.00E+00 5.50E+01	1.00E+00	NC 1.05E+07	1.00E+00
în foluene		Lognormal Lognormal	1.40E+01 1.45E-01	2.28E+01	1.11E+02 7.65E+01	2.05E+07	1.11E+02 7.65E+01
otal Xylenes		Normal	1.45E-01 1.51E+00	1.48E+01	2.36E+01	3.46E+01	2.36E+01
richloroethene	I	NC	1.00E-02	1.00E-02	1.00E-02	NC	1.00E-02
anadium	I	Lognormal	7.00E+00	3.23E+01	9.50E+01	1.97E+02	9.50E+01
	1	Lognormal	8.00E+00	4.74E+03	3.95E+04	1.61E+07	3.95E+04
linc	,, ,,						

<sup>(</sup>a) - Only concentrations reported as detected by the laboratory were used in the calculation of statistics for subsurface soil.

#### Appendix C-4.10 Summary Statistics for Site I Subsurface Soil Sauget Area i

		Shapko-Willer's Test for Normally		ary Statistics		95% UCL	
			3	y 84			
Constitute	Humber of Samples for Statistics to	Detaset Distribution			Makaa	UCL	Site Concentration
f. f. fi-Trichtorgethane	2	Logrames	4 32E-C1	1.06E+00	1.69E+00	NC	1.69E+00
1.2.4-Trichlorobergene	i	Logiona	671E+00	140E+03	8.26E+03	1 17E+06	8.26E+03
1.2-Dichloroberosme	5	Lognome	2.686-00	8.29E+01	3.24E+02	7.93E+04	3.24E+02
1.3-Dichloroberzene	Z	NC	. 89E+0.	4 45E+01	7.01E+01	NC	7.01E+01
: 4-Dc/Noroberzene		Lognome	. 60E+00	2 55E+02	1 84E+03	1.25E+05	1.84E+03
2.4-Ochlorophend		NC	9 00E+00	9 00E+00	5 00E+00	NC .	9.00E+00
2-Butanone (MEX) 2-Methylnapthalene	• •	Norrei	: 20E-02 : 70E+00	6.86E+00 3.85E+01	1 69E+01 1 69E+02	9.51E-00 2.54E-03	9.61E+00 1.69E+02
4 4:001	1 ,	NC	4.31E+00	4 31E+00	4 31E+00	NC NC	4.31E+00
44.000		NC	6.64E+0C	82E+01	2.97E+01	NC NC	2.97E+01
4-Chiorografine		NC	4 32E+0*	4 32E+01	4.32E+D1	NC.	4.32E+01
4-Methyl-2-pentatione	,	NC	1 00E-03	2 08E+00	4 16E+00	NC	4.16E+00
Aceneothere		NC	1 40E+3"	140E+01	1.40E+01	NC	1.40E+01
Acetone		Lognomer	5.49E-01	6 66E+00	1 69E+01	2.17E+01	1.69E+01
Aluminum		Logranus	1 01E+03	4 17E+03	1.35E+04	7.52E+03	7.92E+03
Anthracene		NC	2.31E+0*	1.13E+02	2.03E+02	NC .	2.03E+02
Antimony Assenc		Lognorius	1 40E+01	2.23E+03	6.96E+03	5.75E+53	6.66E+03
Actionic Bantum	1 :	Lognomes	1 00E+00 8 00E+00	6 565E+00	1 40E+01 3 50E+03	2.05E+01 4.82E+04	1.40E+01 3.60E+03
Berzene	1	Logrome	2.30E-02	3 81E+00	2.41E+01	2.34E+02	2.41E+Gt
Benzotalanthracene	1 :	Lograme	2.47E+00	4 59E+00	€ 72E+00	NC	6.72E+00
Berzojajpyere	1	NC	2 47E+00	247E+00	2 47E+00	NC	2.47E+00
Benzo(b)fluoranthene	2	NC	1.51E+00	1 70E+01	3.24E+01	NC	3.24E+01
Berzoc aod	1	NC	6.21E-01	6.21E+01	6.21E+01	NC	6.21E+01
Beryllum		NC	: 53E+03	1 53E+03	1 53E+03	NC	1.53E+03
Butly benzy phihelete	,	MC	1 39E+02	1.39E+02	1.39E+02 1.92E+02	NC	1.39E+02
Pentachtologhend(PCP) Cadmium	. ;	NC	1.92E+02 2.00E+00	1 92E+02 5 57E+00	1.30E+01	NC 1.84E+01	1.92E+02 1.30E+01
Chicroberosene	1	Lognomes Lognomes	200E-02	347E+01	1.27E+02	7 1 <del>SE+</del> 04	1.27E+02
Опольст	- :	LOOPOTE	4 00E+00	7 61E+01	7.31E+02	3.60E+02	3.60E+02
Otrysene	l F	Nome	3 57E+00	4 78E+00	5.59E+00	9.88E+00	5.59E+00
Cobat	7 1	שריטיקט.	1.30E+0*	3.89E+01	1 40E+02	1.05E+02	1.40E+02
Copper		Lagnames	2.30E+01	2 98E+02	6.30E+02	2.10E+03	6.30E+02
Cyamide	1	Lognomer	2.00E+00	1 06E+03	3 18E+03	1 14E+60	3.18E+03
Ch-Ni-busyl philheliate		Lognomer	: 34E-0:	3.71E+01	2.03E+02	3 15E+04	2.03E+02
Diberolutan Osabsitatibaran	1	NC NC	5.59E+01	5 59E+00 1	5.59E+00 1.69E+01	NC NC	5.59E+00 1.69E+01
Oledhyliphshelete Ethylbenzene		Lagrame	9 60E-02	4 6SE+00	1 51E+01	1 14E+02	1.51E+01
Ruggerthane	1	Logrania	8 91E+00	7 69E+01	2.03E+02	3.81E+13	2.03E+02
Fluorene		Lognome	3.08E+00	1 49E+01	3.54E+01	7.33E+08	3.54E+01
Herachic robenzane	[ * i	Lognome	3.23E+C*	2 58E+02	1.27E+03	2 10E+03	1.27E+03
Helachloraethane	1	NC 1	3.01E+00	3 01E+00	3 D1E+00	NC	3.01E+00
h <del>or</del>		Lognome	5 43E+02	1 17E+04	4 152+04	3 11E+04	3 11E+04
Lead	4	Lognomes	3 00E+00	2 06E+03	2.33E+04	3.08E+05	2.33E+04
Manganese	1	NC :	9.80E+C1	9 80E+01	9.50E+01	NC an	9.80E+01
Marcury Mathylane chlonde	_	Normal Lognomes	5.00E-01 7.00E-03	1 70E+00 1 52E+00	3.20E+00 6.77E+00	2.69E+00 1.64E+02	3.20E+00 6.77E+00
N-Mitrosodiphenylemne		NC I	4 59E+01	7 31E+01	1.00E+02	NC NC	1.00E+02
Nacifalizie		Lognome	1 10E -00	9.81E+01	5 15E+02	5.75E-05	5.15E+02
Note		ognome	9 00E-01	3 35E+02	241E+03	2.50E+04	2.41E+03
name to the contract of the co		ogrania	1 32E+00	3 43E+01	1.02E+02	6.24E+04	1.02E+02
Phend	2 1	NC i	1.52E+01	2 11E+01	2.70E+01	NC	2.70E+01
- Juans		Lognomes	2.21E+00	1 96E+01	4.93E+01	8 42E+05	4.93E+01
		MC	1 32E+03	1 32E+03	1.32E+03	NC	1.32E+03
Total PCBs		Nomel	2.04E+C1	1.81E+02	3 43E+02	3.06E+02	3.43E+02
l'elrachionselhene l'im	1	Logranie	6 12E-01	2.57E+00	5.27E+00	1.51E+01	5.27E+00 5.50E+01
ion Io <del>liane</del>		בייסיוש	2.00E+00 4.80E-02	1 92E+01 1 13E+01	5.50E+01 7.79E+01	1 15E+02 4 10E+02	5.50E+01 7.79E+01
rocere Total Xylanes	1 1	שרסיטים	8 00E-02	4 96E+00	1.92E+01	2.70E+02	1.92E+01
Conceptions		NC .	4 93E-C2	4 93E+02	4 93E+02	NC	4.93E+02
inchioroethere		Normal	6.48E-01	2.23E+00	3.81E+00	1.22E+01	3.81E+00
/anadum	1 1	.ognomes	1.80E+01	1 D7E+02	5.53E+02	8.22E+02	5.53E+02
žnc .		DOMESTIC OF THE PROPERTY OF TH	1.30E+01	6.24E+02	6.33E+03	5.00E+03	5.00E+03
osC-etry/hexy/phthalate		ograme!	2.36E+00	3 49E+01	1.31E+02	7.45E+02	1.31E+02
rans-1,2-Okhloroethene	<u> </u>	MC	3 00E-03	3 00E-03	3.00E-03	NC NC	3.00E-03

| 3 ODE-23 | 3 ODE-23 | 3 ODE-23 | 3 ODE-23 | MC |
|(ii) - Only concentrations recorded as detected by the aboratory were used in the calculation of statistics for subsurface soil.

#### Appendix C-4.11 Summary Statistics for Site L Subsurface Soil Sauget Area I

Number of Samples for Dataset   Summary Statistics (mg/kg)   Site Concentral (mg/kg)	[- <del></del>	Т	Shapiro-Wilke's	<del></del>	- 3	<del></del>		T
Number of Samples for Dataset Statistics (s)   Dataset Statistics (s)	1 .	1		1		٠.		
Number of Samples for   Dataset   Statistics (a)   Dataset   Statistics (b)   Dataset   Distribution   Minimum   Mean   Maximum   UCL   Sits Concentrat   (mg/kg)   1,2,4-Thichirocherizane   3   Normal   1,00-C9   3,50E+00   7,70E+00   7,70E+00   1,3-Dichioroberizane   1   NC   4,30E+00   4,30E+00   4,30E+00   4,30E+00   1,00E+		1	Normality	Summ	ary Statistics	(mg/kg)	(mg/kg)	
Number of Samples for   Dataset   Statistics (a)   Dataset   Statistics (b)   Dataset   Distribution   Minimum   Mean   Maximum   UCL   Sits Concentrat   (mg/kg)	•	1						
Constituent		1						
Constituent	ĺ		Datamet	1	:		1	Site Compositorium
1.2.4-Introloroberozene	Constituent			Minimum	Mean	Maximum	UCL	
1,2-Dichlorobenzene								
1.4-Dichlorobenzene				1.00E-02			7.23E+00	7.70E+00
2.4.Fichlorophenol				I .				í
2.4-Dichlorophenol   2	,							
2-Chicrophenol				1				
2-Methy/naphalene								1
4-Chioraniline			1					
4-Methylx-2-pentanone						1	1	
Accesaphthene								
Acetanphylene								
Acetone								
Aluminum								
Animony				1				
Assentic   10   Lognormal   4.90E+00   5.36E+01   1.72E+02   5.47E+04   1.42E+03   6.77E+13   5.70E+00   9.50E+00   1.44E+03   5.47E+04   1.42E+03   5.70E+00   9.5			Lognormal	2.80E-02	1.46E+00	4,20E+00		4.20E+00
Bantum			1 -					
Benzzo(a) parthracene						1		
Benzz(a)pn/tracene	· ·			,				
Benzo(g)/hiloranthene   3	Benzo(a)anthracene			7.50E-02	2.46E+00	8.60E+00		8.60E+00
Benzo(g), h)perylene								
Benzzik) Fluoranthene								
Butyl benzyl phthalate	10							
Corrosivity								
Pentachlorophenol(PCP)								
Reactivity-Suffide								
Cadmium         6         Lognormal         1.90E-02         8.03E+00         4.20E+01         1.32E+10         4.20E+01           Calcium         6         Lognormal         1.55E+04         2.81E+04         7.55E+04         6.01E+04         7.55E+04           Chloroform         3         Lognormal         1.20E-02         1.25E+00         5.30E+00         2.41E+03         5.30E+00           Chrornium         10         Lognormal         4.90E-02         6.80E+00         2.03E+01         2.36E+01         2.36E+01           Chrornium         10         Lognormal         7.60E-02         2.20E+00         7.34E+08         8.20E+00         7.36E+08         2.06E+01         2.36E+01         <					1			
Chlorobenzene	Cadmium	6						
Chloroform   3								
Chromium         10         Lognormal         3.00E+00         1.16E+01         2.70E+01         2.38E+01         2.38E+01           Chysene         4         Lognormal         7.60E-02         2.20E+00         8.20E+00         7.34E+08         8.20E+00           Cobalt         7         Normal         5.90E+00         7.70E+00         9.00E+00         8.67E+00         9.00E+00           Copper         10         Lognormal         9.70E+00         9.27E+01         3.08E+02         4.33E+02         3.06E+02           Cresol(m,p)         4         Lognormal         1.00E-01         1.43E-01         1.90E-01         2.58E-01         1.90E-01           Cyanide         1         NC         4.60E-01         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         3.10E-01         6.55E-01         1.00E+00         NC         1.00E+00         NC         1.00E+00         NC         1.00E+00         NC         1.00E+00         NC         4.00E-02         4.00E-02				,				
Chrysene         4         Lognormal Normal         7.60E-02         2.20E+00         8.20E+00         7.34E+08         8.20E+00           Cobalt         7         Normal         5.90E+00         7.70E+00         9.00E+00         8.67E+00         9.00E+00           Copper         10         Lognormal         9.70E+00         9.27E+01         3.08E+02         4.33E+02         3.08E+02           Cresol(m,p)         4         Lognormal         1.00E-01         1.43E-01         1.90E-01         2.58E-01         1.90E-01           Cyanide         1         NC         4.60E-01         4.60E-01         NC         4.60E-01           Di-N-butyl phthalate         4         Lognormal         1.71E-01         1.28E+00         3.10E+03         3.15E+03         2.78E+00           Dibenofuran         2         NC         4.20E-02         1.52E+00         3.00E+00         NC         4.60E-01           Dibenofuran         2         NC         4.00E-02         4.00E-02         4.00E-02         NC         1.00E+00         NC         4.00E-02         NC         1.00E+00         NC         4.00E-02         NC         1.00E+00         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02								
Copper         10         Lognormal         9.70E+00         9.27E+01         3.08E+02         4.33E+02         3.08E+02           Creso((m.p.)         4         Lognormal         1.00E-01         1.43E-01         1.90E-01         2.58E-01         1.90E-01           Cyanide         1         NC         4.60E-01         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         1.00E+00         NC         1.00E+00         NC         1.00E+00         NC         1.00E+00         NC         1.00E+00         NC         1.00E+00         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         1.60E+01         NC         1.60E+01         1.60E+01         NC         4.00E-02         2.54E+00         NC         4.00E-02 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>7.34E+08</td> <td>8.20E+00</td>							7.34E+08	8.20E+00
Cresol(m,p)         4         Lognormal         1.00E-01         1.43E-01         1.90E-01         2.58E-01         1.90E-01           Cyanide         1         NC         4.60E-01         4.60E-01         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         4.60E-01         NC         3.15E+03         3.76E+00         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         3.00E+00         NC         4.00E-02         4.00E-02         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         5.00E+09         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         4.00E-02         4.00E-02         NC         4.00E-02<				l				
Cyanide         1         NC         4.60E-01         4.60E-01         4.60E-01         NC         4.60E-01           Di-N-butyl phthalate         4         Lognormal         1.71E-01         1.28E+00         2.78E+00         3.15E+03         2.78E+00           Dibenofuran         2         NC         4.20E-02         1.52E+00         3.00E+00         NC         3.00E+00           Diethylphthalate         2         Lognormal         3.10E-01         6.55E-01         1.00E+00         NC         1.00E+00           Ethylbenzene         1         NC         4.00E-02         4.00E-02         4.00E-02         NC         4.00E-02           Fluoranthene         4         Lognormal         1.30E-01         4.27E+00         1.60E+01         2.05E+09         1.60E+01           Fluoranthene         2         NC         7.90E-02         2.54E+00         1.60E+01         2.05E+09         1.60E+01           Fluoranthene         1         NC         4.80E+00         4.80E+00         NC         5.00E+00           Hevachlorobenzene         1         NC         4.90E-02         4.90E-02         NC         1.60E+01           Hevachlorobenzene         1         NC         4.90E-02         4.90E-02								
Di-N-butyl phthalate         4         Lognormal         1.71E-01         1.28E+00         2.78E+00         3.15E+03         2.78E+00           Dibenofuran         2         NC         4.20E-02         1.52E+00         3.00E+00         NC         3.00E+00           Diethylphthalate         2         Lognormal         3.10E-01         6.55E-01         1.00E+00         NC         1.00E+00           Ethylbenzene         1         NC         4.00E-02         4.00E-02         NC         4.00E-02           Fluoranthene         4         Lognormal         1.30E-01         4.27E+00         1.60E+01         2.05E+09         1.60E+01           Fluoranthene         2         NC         7.90E-02         2.54E+00         5.00E+00         NC         5.00E+01           Hexachlorobenzene         1         NC         4.80E+00         4.80E+00         NC         5.00E+00           Hexachloroethane         1         NC         4.90E-02         4.90E-02         NC         4.90E-02           Ideno(1,2,3-cd)pyrene         2         NC         1.10E-01         1.51E+00         2.90E+00         NC         2.90E+00           Iron         11         Normal         1.40E+03         9.96E+03         2.40E+04								
Diethylphthalate         2         Lognormal         3.10E-01         6.55E-01         1.00E+00         NC         1.00E+00           Ethylbenzene         1         NC         4.00E-02         4.00E-02         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         NC         4.00E-02         1.60E+01         NC         5.00E+00         NC         5.00E+00         NC         5.00E+00         NC         5.00E+00         NC         5.00E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         <		4	-					
Ethylbenzene   1			_					
Fluoranthene         4         Lognormal         1.30E-01         4.27E+00         1.60E+01         2.05E+09         1.60E+01           Fluorene         2         NC         7.90E-02         2.54E+00         5.00E+00         NC         5.00E+00           Hexachlorobenzene         1         NC         4.80E+00         4.80E+00         NC         4.80E+00           Hexachloroethane         1         NC         4.90E-02         4.90E-02         NC         4.90E-02           Ideno(1,2,3-cd)pyrene         2         NC         1.10E-01         1.51E+00         2.90E+00         NC         2.90E+00           Iron         11         Normal         1.40E+03         9.96E+03         2.40E+04         1.45E+04         1.45E+04           Lead         13         Lognormal         2.20E-01         7.46E+01         6.64E+02         5.83E+03         6.64E+02           Magnesium         6         Normal         3.84E+02         4.91E+03         9.44E+03         7.92E+03         9.44E+03           Mercury         7         Lognormal         1.00E+01         2.19E+02         7.82E+02         3.68E+03         7.82E+02           Methylene chloride         5         Lognormal         5.00E-03         4.89E-01								
Fluorene         2         NC         7.90E-02         2.54E+00         5.00E+00         NC         5.00E+00           Hexachlorobenzene         1         NC         4.80E+00         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.80E+00         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         4.90E-02         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         2.90E+00         NC         4.90E-02         NC         4.90E-02         3.68E+02         3.84E+02         A.90E-02         2.90E+00         7.82E+02         3.68E+03         7.82E+02         3.68E+02         7.82E+02<								
Hexachloroethane         1         NC         4.90E-02 1.10E-01         4.90E-02 2.90E+00         NC         4.90E-02 2.90E+00         NC         4.90E-02 2.90E+00         NC         4.90E-02 2.90E+00         NC         4.90E-02 2.90E+00         NC         4.90E-02 2.90E+00         NC         2.90E+00         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+04         1.45E+03         3.68E+03         7.92E+03         6.64E+02         7.92E+03         7.82E+02         1.80E+03         7.82E+02	Fluorene							
Ideno(1,2,3-cd)pyrene   2 NC		,						
Iron								
Lead         13         Lognormal Normal         2.20E-01         7.46E+01         6.64E+02         5.83E+03         6.64E+02           Magnesium         6         Normal         3.84E+02         4.91E+03         9.44E+03         7.92E+03         9.44E+03           Manganese         11         Lognormal         1.00E+01         2.19E+02         7.82E+02         3.68E+03         7.82E+02           Mercury         7         Lognormal         1.00E-02         3.09E-01         1.80E+00         6.02E+01         1.80E+00           Methylene chloride         5         Lognormal         5.00E-03         4.89E-01         2.28E+00         5.92E+07         2.22E+00           Napthalene         4         Lognormal         9.60E-02         2.02E+00         7.30E+00         7.72E+06         7.30E+00           Nickel         10         Lognormal         2.10E+01         3.78E+02         2.39E+03         2.67E+03         2.39E+03           Phenol         5         Normal         3.46E-01         8.77E+00         1.60E+01         1.57E+01         1.60E+01           Potassium         6         Lognormal         9.75E+02         1.31E+03         2.28E+03         2.28E+03         2.28E+03         2.28E+03 <t< td=""><td></td><td></td><td></td><td> —</td><td></td><td></td><td></td><td></td></t<>				—				
Manganese         11         Lognormal Lognormal         1.00E+01         2.19E+02         7.82E+02         3.68E+03         7.82E+02           Mercury         7         Lognormal         1.00E-02         3.09E-01         1.80E+00         6.02E+01         1.80E+00           Methylene chloride         5         Lognormal         5.00E-03         4.89E-01         2.28E+00         5.92E+07         2.28E+00           Napthalene         4         Lognormal         9.60E-02         2.02E+00         7.30E+00         7.72E+06         7.30E+00           Nickel         10         Lognormal         2.10E+01         3.78E+02         2.39E+03         2.67E+03         2.39E+03           Phenal         5         Lognormal         9.10E-02         5.18E+00         2.30E+01         1.33E+06         2.30E+01           Potassium         6         Lognormal         9.75E+02         1.31E+03         2.28E+03         1.86E+03         2.28E+03           Pyrene         4         Lognormal         1.30E-01         5.96E+00         2.30E+01         3.48E+10         2.30E+01								
Mercury         7         Lognormal Lognormal         1.00E-02         3.09E-01         1.80E+00         6.02E+01         1.80E+00           Methylene chloride         5         Lognormal         5.00E-03         4.89E-01         2.28E+00         5.92E+07         2.28E+00           Nickel         10         Lognormal         2.10E+01         7.30E+00         7.72E+06         7.30E+00           Phenanthrene         5         Lognormal         9.10E-02         5.18E+00         2.30E+01         1.33E+06         2.30E+01           Phenol         5         Normal         3.46E-01         8.77E+00         1.60E+01         1.57E+01         1.60E+01           Potassium         6         Lognormal         9.75E+02         1.31E+03         2.28E+03         2.28E+03           Pyrene         4         Lognormal         1.30E-01         5.96E+00         2.30E+01         1.34E+10         2.30E+01								
Methylene chloride         5         Lognormal         5.00E-03         4.89E-01         2.28E+00         5.92E+07         2.28E+00           Napthalene         4         Lognormal         9.60E-02         2.02E+00         7.30E+00         7.72E+06         7.30E+00           Nickel         10         Lognormal         2.10E+01         3.78E+02         2.39E+03         2.67E+03         2.39E+03           Phenanthrene         5         Lognormal         9.10E-02         5.18E+00         2.30E+01         1.33E+06         2.30E+01           Phenol         5         Normal         3.46E-01         8.77E+00         1.60E+01         1.57E+01         1.60E+01           Potassium         6         Lognormal         9.75E+02         1.31E+03         2.28E+03         1.86E+03         2.28E+03           Pyrene         4         Lognormal         1.30E-01         5.96E+00         2.30E+01         3.48E+10         2.30E+01								
Napthalene         4         Lognormal Lognormal         9.60E-02 2.02E+00         7.30E+00 7.30E+00         7.72E+06 7.30E+00           Nickel         10         Lognormal 2.10E+01 3.78E+02 2.39E+03 2.67E+03 2.39E+03         2.39E+03 2.39E+03 2.39E+03           Phenanthrene         5         Lognormal Normal 3.46E-01 8.77E+00 1.60E+01 1.57E+01 1.60E+01         1.60E+01 1.57E+01 1.60E+01           Potassium         6         Lognormal Lognormal 1.30E-01 5.96E+00 2.30E+01 3.48E+10 2.30E+01         1.34E+10 2.30E+01		1 1						
Nickel         10         Lognormal Lognormal         2.10E+01         3.78E+02         2.39E+03         2.67E+03         2.39E+03           Phenanthrene         5         Lognormal         9.10E-02         5.18E+00         2.30E+01         1.33E+06         2.30E+01           Phenol         5         Normal         3.46E-01         8.77E+00         1.60E+01         1.57E+01         1.60E+01           Pyrene         4         Lognormal         1.30E+02         5.96E+00         2.30E+01         3.48E+10         2.30E+01		, ,						
Phenol         5         Normal         3.46E-01         8.77E+00         1.60E+01         1.57E+01         1.60E+01           Potassium         6         Lognormal         9.75E+02         1.31E+03         2.28E+03         1.86E+03         2.28E+03           Pyrene         4         Lognormal         1.30E-01         5.96E+00         2.30E+01         3.48E+10         2.30E+01		10	Lognormal	2.10E+01	3.78E+02	2.39E+03	2.67E+03	
Potassium         6         Lognormal         9.75E+02         1.31E+03         2.28E+03         1.86E+03         2.28E+03           Pyrene         4         Lognormal         1.30E-01         5.96E+00         2.30E+01         3.48E+10         2.30E+01								
Pyrene 4 Lognormal 1.30E-01 5.96E+00 2.30E+01 3.48E+10 2.30E+01								
	Total PCBs	2 [	NC	1.60E+01	2.58E+02	5,00E+02	NC	5.00E+02
Toluene 7 Lognomal 5.00E-02 6.65E+01 4.00E+02 3.21E+09 4.00E+02								
Total Xylenes         4         Lognormal         1.79E-01         3.10E+00         1.10E+01         2.48E+06         1.10E+01           Vanadium         9         Lognormal         7.70E+00         3.23E+01         1.31E+02         7.51E+01         7.51E+01		i i						
Variabiliti 5   Lognormal   7.70E+00   5.23E+01   7.51E								
bis(2-ethylhexyl)phthalate 6 Normal 1.70E-02 9.21E-01 2.20E+00 1.61E+00 2.20E+00		1						

<sup>(</sup>a) - Only concentrations reported as detected by the laboratory were used in the calculation of statistics for subsurface soil.

Appendix C 4.12

Comparison of Surface Soil Detection Limits to Ecological Benchmarks

Floodplain Soils

Sauget Area I

Compounds	Maxiumum Detection Limit or Range	Soil Benchmark	Conments on detection limits
Herbicides (ug/kg)			
2,4,5-T	9.9	:	
2,4,5-TP (Silvex)	9.9		1
2,4-D	9.9		
2,4-DB	9.9		
Dalapon	85		
Dicamba	47		
Dichloroprop	230		
Dinoseb	230		
MCPA	2500	,	
MCPP	4700	İ	
Metals (mg/kg)		_	
Antimony	2.5 0.75	5 10	
Beryllium	1	10	
Cyanide, Total	0.66 0.68		
Molybdenum	0.00	2	Detection limit exceeds benchmark in
Selenium	0.97 to 1.3	0.21	56/56 samples for floodplain soil
	1.2	2	50750 samples for modiplain son
Silver	260		
Sodium	200		Detection limit exceeds benchmark in
Thallium	0.97 to 1.3	1	42/55 samples for floodplain soil
PCBs (ug/kg)	0.57 to 1.3	'	427 55 samples for noodplain son
Decachlorobiphenyl	91	371"	
• •	35	371"	}
Dichlorobiphenyl	100	371*	
Heptschlorobiphenyl		371*	
Hexachlorobiphenyi	70 35	371"	
Monochlorobiphenyl	1		
Nonachloroblphenyl	180	371"	
Octachlorobiphenyl	100	371*	
Pentachlorobiphenyl	70	371*	
Tetrachlorobiphenyl	70	371*	
Trichlorobiphenyl	35	371*	
Pesticides (ug/kg)			

	Maxiumum Detection Limit or		
Compounds	Range	Soil Benchmark <sup>1</sup>	Comments on detection limits
4,4'-DDD	7.8	Con Seneralian	Comments on detection innits
4,4'-DDE	7.2		· ·
4,4'-DDT	7.4		
Aldrin	18	·	
Alpha Chlordane	18	}·	
alpha-BHC	5.4		· ·
beta-BHC	5.4	· ·	
delta-BHC	5.4		*
Dieldrin	36	ļ	
Endosulfan I	18	1	
Endosulfan II	36		
Endosulfan sulfate	36		• • • • • • • • • • • • • • • • • • • •
Endrin	36		
Endrin aldehyde	36	<u> </u>	İ
Endrin ketone	36	· ·	<u> </u>
Gamma Chlordane	18		
gamma-BHC (Lindane)	18		•
Heptachlor	18	ļ	i
Heptachlor epoxide	18		
Methoxychlor	180		
Toxaphene	1800		·
SVOCs (ug/kg)	1000		
1,2,4-Trichlorobenzene	220	20000	
1,2-Dichlorobenzene	220		• •
1,3-Dichlorobenzene	220		
1,4-Dichlorobenzene	220	20000	
2,2'-Oxybis(1-Chloropropane)	210	20000	
	220	9000	••
2,4,5-Trichlorophenol	220	4000	
2,4,6-Trichlorophenol	220	4000	
2,4-Dichlorophenol	990	20000	
2,4-Dinitrophenol	220	20000	
2,4-Dinitrotoluene	220	}	
2,6-Dinitrotoluene			
2-Chloronaphthalene	220		
2-Chlorophenol	220		
2-Methylnaphthalene	220	<u> </u>	<u> </u>

	Maxiumum Detection Limit or		
Compounds	Range	Soil Benchmark	Comments on detection limits
2-Methylphenol (o-cresol)	220	ł	}
2-Nitroaniline	990		
2-Nitrophenol	220		1
3,3'-Dichlorobenzidine	430		
3-Methylphenol/4-Methylphenol	410	1	
3 Nitroaniline	990		
4,6-Dinitro-2-methylphenol	1100		
4-Bromophenylphenyl ether	220		
4-Chioro-3-mathylphanol	220		
4-Chloroaniline	430		]
4-Chlorophenylphenyl ether	220		
4-Nitroaniline	1100		
4-Nitrophenol	1100	7000	
Acenaphthene	220	20000	
Acenaphthylene	220		
Anthracene	220		
Benzo(a)anthracene	220		
Benzo(a)pyrene	180		
Benzo(b)fluoranthene	210		
Benzo(g,h,i)perylene	220		
Benzo(k)fluoranthene	220		
bis(2-Chioroethoxy)methane	220		
bis(2-Chloroethyl)ether	220		
bis(2-Ethylhexyl)phthalate	220	1	
Butylbenzylphthalate	220		
Carbazole	220	İ	
Chrysene	210		
Di-n-butylphthalate	210	200000	
Di-n-octylphthalate	210		
Dibenzo(a,h)anthracene	99		
Dibenzofuran	220		
Diethylphthalate	220	100000	
Dimethylphthalate	220	1	}
Fluoranthene	220		
Fluorene	220		
Hexachlorobenzene	92		

	Maxiumum	<del> </del>	
	Detection		
	Limit or		
Compounds	Range	Soil Benchmark <sup>1</sup>	Comments on detection limits
Hexachlorobutadiene	220		
Hexachlorocyclopentadiene	220	10000	
Hexachloroethane	220		
Indeno(1,2,3-cd)pyrene	220	}	·
Isophorone	220		
N-Nitroso-di-n-propylamine	220	} ·	
N-Nitrosodiphenylamine	210		· - ]
N-Nitrosodiphenylamine/Diphenylamine	220	-	
Naphthalene	220	}	
Nitrobenzene	220		••
Pentachlorophenol	1100	3000	
Phenanthrene	220		
Phenol	220	30000	
Pyrene	220		
trans-1,3-Dichloropropene	6.7	ł	·
VOCs (ug/kg)		1	
1,1,1-Trichloroethane	8.3	}	
1,1,2,2-Tetrachloroethane	8.3		
1,1,2-Trichloroethane	8.3	1	<u> </u>
1,1-Dichloroethane	8.3	1	
1,1-Dichloroethene	7.7	]	1
1,2-Dichloroethane	8.3		
1,2-Dichloropropane	8.3	,	
2-Butanone (MEK)	56		
2-Hexanone	42	1	·
4-Methyl-2-pentanone (MIBK)	42	[	Í
Acetone	83		
Benzene	8.3	( )	
Bromodichloromethane	8.3		ļ
Bromoform	8.3	ł	
Bromomethane (Methyl bromide)	17		
Carbon disulfide	8.3		
Carbon tetrachloride	8.3		
Chlorobenzene	8.3	40000	
Chloroethane	17	40000	
<b>.</b>	8.3		
Chloroform	0.3	<u> </u>	<u> </u>

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Compounds	Maxiumum Detection Limit or Range	Soll Benchmark <sup>1</sup>	Comments on detection limits
Chloromethane	17		
Cis/Trans-1,2-Dichloroethene	8.3		
cis-1,3-Dichloropropene	6.7		
Dibromochloromethane	8.3		
Ethylbenzene	8.3		
Methylene chloride (Dichloromethane)	8.3		
Styrene	8.3	300000	
Tetrachloroethene	8.3		
Toluene	8.3	200000	
Trichloroethene	8.3		
Vinyl chloride	17		
Xylenes, Total	8.3		
Dioxins (ug/kg)			
2,3,7,8-TCDD TEQ (mammals)		3.15E-06	

<sup>&</sup>lt;sup>1</sup> Effroymson et al., 1997. Preliminary Goals for Ecological Endpoints.

<sup>\*</sup> Benchmark for PCBs.

#### Comparison of Surface Soil Detection Limits to Ecological Benchmarks Sites G, H, I, L, and N Sauget Area (

[	Maximum		
}	Detection		
	Limit or	Soil	
Compounds	Range	Benchmark <sup>1</sup>	Comments on detection limits
Herbicides (ug/kg)	<u> </u>		
2,4,5-T	180		
2,4,5-TP (Silvex)	180		
2,4-D	180		The second secon
2,4-DB	180		
Dalapon	1400		
Dicamba	440		
Dichloroprop	2200	,	
Dinoseb	2200	ı	
MCPA	44000		
MCPP	44000	na na mana ang ang ang ang ang ang ang ang ang	
Metals (mg/kg)			
Antimony	2.4	5 10	The second control of the second control of
Beryllium	0.59	10	
Cyanide, Total	0.6		Personal and a common color to the Control of Control o
Selenium	0.99 to 1.2	0.21	Detection limit exceeds benchmark in: 4/4 samples for Site G; 1/4
			samples for Site H; 1/4 samples for Site I; 3/4 samples for Site N.
			Detected in all samples for L.
Silver	1.2	2	The state of the s
Sodium	220		
Thallium	0.62 to 1.2	1	Detection limit exceeds benchmark in: 4/4 samples for Site G; 1/4
			samples for Site H; 1/4 samples for Site I; 2/4 samples for Site N.
			Detected in all samples for L.
PCBs (ug/kg)			
Decachlorobiphenyl	17 to 930	371 <sup>2</sup>	Maximum detection limit exceeds Total PCB benchmark.
Dichlorobiphenyl	170	371 <sup>a</sup>	A CONTRACTOR OF THE CONTRACTOR
Heptachlorobiphenyl	10 to 530	371 <sup>a</sup>	Maximum detection limit exceeds Total PCB benchmark.
Hexachlorobiphenyl	350	371 <sup>a</sup>	
Monochlorobiphenyl	170	371 <sup>a</sup>	
Nonachlorobiphenyl	17 to 880	371 <sup>a</sup>	Maximum detection limit exceeds Total PCB benchmark.
Octachlorobiphenyl	10 to 530	371 <sup>a</sup>	Maximum detection limit exceeds Total PCB benchmark.
Pentachlorobiphenyl	350	371 <sup>a</sup>	
	350	371 <sup>a</sup>	
Tetrachlorobiphenyl	1 777	371 <sup>a</sup>	
Trichlorobiphenyl	170	3/1	
Pesticides (ug/kg)	40		
4,4'-DDD	18		
4,4'-DDE	7.1 18		
4,4'-DDT			
Alcho Chlordone	9.1		The second secon
Alpha Chlordane	380	<u>t                                    </u>	<u></u>

## Comparison of Surface Soil Detection Limits to Ecological Benchmarks Sites G, H, I, L, and N Sauget Area I

		Sauge	N Area I
	Maximum		
	Detection	}	
	Limit or	Soil	
Compounds	Range	Benchmark <sup>1</sup>	Comments on detection limits
alpha-BHC	110		
bota-BHC	110		
delta-BHC	110	1	
Dieldrin	18		
Endosulfan I	9.4		
Endosulfan II	18		
Endosulfan sulfate	730		
Endrin	18		
Endrin aldehyde	18		
Endrin ketone	7.1		
Gamma Chlordane	3.7		
gamma-BHC (Lindane)	380		
Heptachlor	9.4	Ī	
Heptachlor epoxide	3.7		
Methoxychlor	94	ļ	
Toxaphene	38000		
SVOCs (ug/kg)			
1,2,4-Trichlorobenzene	360	20000	
1.2-Dichlorobenzene	360		
1.3-Dichlorobenzene	360		
1.4-Dichlorobenzene	360	20000	
2,2'-Oxybis(1-Chloropropane)	360	1	
2,4,5-Trichlorophenol	360	9000	
2,4,6-Trichlorophenol	360	4000	
2,4-Dichlorophenol	360		ļ
2,4-Dinitrophenol	1800	20000	
2,4-Dinitrotoluene	360		
2,6-Dinitrotoluene	360	i	
2-Chloronaphthalene	360		
2-Chlorophenol	360		
2-Methylnaphthalene	200	Ì	
2-Methylphenol (o-cresol)	360	}	
2-Nitroaniline	1800	1	
2-Nitrophenol	360	1	
2-Nitropheriol 3,3'-Dichlorobenzidine	710		
3-Methylphenol/4-Methylphenol	360		
3-Nitroaniline	1800		
4,6-Dinitro-2-methylphenol	1800		
4-Bromophenylphenyl ether	360	}	
4-Chloro-3-methylphenol	360	l	
4-Chloroanlline	710	]	
4-CHIOCOMINIO	1 / 10	J	<u></u>

# Comparison of Surface Soil Detection Limits to Ecological Benchmarks Sites G, H, I, L, and N Sauget Area I

	Maximum		
	Detection	l	
	Limit or	Soil	
Compounds	Range	Benchmark <sup>1</sup>	Comments on detection limits
4-Chlorophenylphenyl ether	360		
4-Nitroaniline	1800	l	• •
4-Nitrophenol	1800	7000	
Acenaphthene	200	20000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Acenaphthylene	360		A the same and same and an area of the same and the same
Anthracene	200	ł <sup>"</sup>	***************************************
Benzo(a)anthracene	200		· ·
Benzo(a)pyrene	110		The first the same of the same
Benzo(b)fluoranthene	200		10 A 17 1 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Benzo(g,h,i)perylene	200		
Benzo(k)fluoranthene	200		
bis(2-Chloroethoxy)methane	360		The second secon
bis(2-Chloroethyl)ether	360		
bis(2-Ethylhexyl)phthalate	360		
Butylbenzylphthalate	360	].	
Carbazole	200		AN MALIANCE CO. C. C. C. C. C. C. C. C. C. C. C. C. C.
Chrysene	200	· ·	The state of the s
Di-n-butylphthalate	360	200000	
Di-n-octylphthalate	360		
Dibenzo(a,h)anthracene	110	1	appear to a second to the seco
Dibenzofuran	200		Topics American Committee of Committee Committ
Diethylphthalate	360	100000	
Dimethylphthalate	360		
Fluoranthene	200		
Fluorene	200		
Hexachlorobenzene	150	l	
Hexachlorobutadiene	360	l	
Hexachlorocyclopentadiene	360	10000	
Hexachloroethane	360		
Indeno(1,2,3-cd)pyrene	200		
Isophorone	360	[	
N-Nitroso-di-n-propylamine	360		
N-Nitrosodiphenylamine	360	_	
Naphthalene	200		
Nitrobenzene	360		
Pentachlorophenol	1800	3000	
Phenanthrene	200	<b>.</b>	
Phenol	360	30000	
Pyrene	200		
VOCs (ug/kg)			
1,1,1-Trichloroethane	9.7		

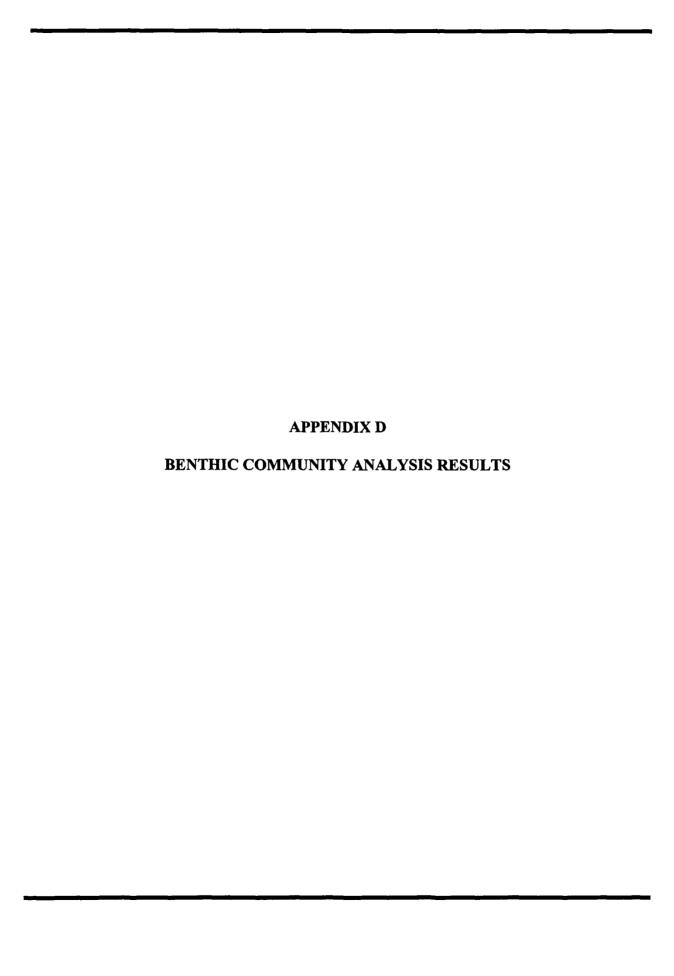
## Comparison of Surface Soil Detection Limits to Ecological Benchmarks Sites G, H, I, L, and N Sauget Area I

•			TO THE STATE OF TH
	Maximum		
	Detection	1	
	Limit or	Soil	
Compounds	Range	Benchmark <sup>1</sup>	Comments on detection limits
1,1,2,2-Tetrachloroethane	9.7	ĺ	
1,1,2-Trichloroethane	9.7	1	
1,1-Dichloroethane	9.7		
1,1-Dichloroethene	8.9		
1,2-Dichloroethane	9.7	(	
1,2-Dichloropropane	9.7		
2-Butanone (MEK)	48	ļ	
2-Hexanone	48		
4-Methyl-2-pentanone (MIBK)	48		
Acetone	97		
Benzene	9.7	l	
Bromodichloromethane	9.7		
Bromoform	9.7	l	
Bromomethane (Methyl bromide)	19		}
Carbon disulfide	9.7		<u> </u>
Carbon tetrachioride	9.7		
Chlorobenzene	9.7	40000	
Chloroethane	19		
Chloroform	9.7	ļ	
Chloromethane	19		
cis-1,3-Dichloropropene	7.8		
Cis/Trans-1,2-Dichloroethene	9.7	1	i
Dibromochloromethane	9.7		
Ethylbenzene	9.7	1	
Methylene chloride (Dichloromethane)	9.7		
Styrene	9.7	300000	
Tetrachloroethene	9.7		
Toluene	9.7	200000	
trans-1,3-Dichloropropene	7.8	J	J
Trichloroethene	9.7	1	
Vinyl chloride	19		
Xylenes, Total	9.7		
Dioxins (ug/kg)	1	l .	
2,3,7,8-TCDD TEQ (mammals)		3.15E-06	

<sup>&</sup>lt;sup>1</sup>Efroymson et al., 1997. Preliminary Remediation Goals for Ecological Endpoints.

Bold indicates detection limit exceeds benchmark.

<sup>\*</sup>Benchmark for PCBs.



Appendix D

Benthic Macroinvertebrate Data for Dead Creek Sector F, the Borrow Pit Lake, and Reference Areas

Sauget Area!

et year of	ali di saya d								Number of		1.5	
Station ID	Dhadam	Class	Order	Family	Sub-Family	Tribe	Genus	Casalas	Organisms	Amount of Sample	Sample	Relative Abundance '
F-1-1	Phylum Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Polypedilum	Species	Counted	Analyzed (%)	Total	(Percent)
F-1-1	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Einfeldia	illinoense	5	50	10	19.23
F-1-1	Annelida	Oligochaeta	Tubificida	Naididae	On Oncomme	CINCIDITIII	Branchiura	sp.	4	50	8	15.38
F-1-1	Arthropoda	Insecta	Diptera	Ceratopogonidae			Culicoides	sowerbyi	3	50	6	11.54
F-1-1	Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae		<del></del>	Sphaerlum	sp.	3	50	6	11.54
F-1-1	Annelida	Oligochaeta	Tubificida	Tubificidae				sp.	2	50	4	7.69
F-1-1	Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus	claparedianus	1	50	2	3.85
F-1-1	Arthropoda	Insecta	Lepidoptera	Pyralidae			Haemonais	waldvogeli	1	50	2	3.85
F-1-1	Arthropoda	Insecta	Hemiptera	Pleidae			Acentria	sp.	1	50	2	3.85
F-1-1	Arthropoda	Insecta	Coleoptera	Hydrophilidae			Neoplea	sp.	1	50	2	3.85
F-1-1	Arthropoda	Insecta	Diptera	Ceratopogonidae		·	Hydrochus	sp.	1	50	2	3.85
F-1-1	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Ceratopogon	sp.	1	50	2	3.85
F-1-1	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	decorus	1	50	2	3.85
F-1-1	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Chironomus	sp.	1	50	2	3.85
F-1-2		Insecta	Diptera	Chironomidae	Chironominae		Tanypus	carinatus		50	2	3.85
F-1-2	Arthropoda Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae	CHRONOMINAC	Chironomini	Chironomus	sp.	17	50	34	56.67
F-1-2	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Sphaerium Polypedilum	sp.	8	50	16	26.67
F-1-2	Annelida	Oligochaeta	Tubificida	Tubificidae	Jim Or Dillinate	Crinonomina	Limnodrilus	illinoense	3	50	6	10.00
F-1-2	Arthropoda	Insecta	Diptera	Ceratopogonidae				claparedianus	1	50	2	3,33
F-1-3	Annelida	Oligochaeta	Tubificida	Naldidae		<del></del>	Ceratopogon	sp.		50	2	3.33
F-1-3			Diptera	Ceratopogonidae		· · · · · · · · · · · · · · · · · · ·	Branchiura	sowerbyi	5	50	10	22.73
	Arthropoda	Insecta			<del></del>		Culicoldes	sp.	4	50	8	18.18
F-1-3	Mollusca	Pelecypoda	Prionodesmacea Prionodesmacea	Sphaeriidae Sphaeriidae			Musculium	sp.	4	50	8	18.18
	Mollusca	Pelecypoda		Chironomidae	Chironominae	Chironomini	Sphaerium	sp.	3	50	6	13.64
F-1-3	Arthropoda	Insecta	Diptera			Chironomini	Chironomus	sp.	2	50	4	9.09
F-1-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Polypedilum	illinoense	2	50	4	9.09
F-1-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	1	50	2	4.55
F-1-3	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon	sp.	<u> </u>	50	2	4,55
F-2-1	Arthropoda	Insecta	Diptera	Ceratopogonidae		<u> </u>	Sphaeromias	sp.	7	50	14	38.89
F-2-1	Annelida	Oligochaeta	Tubificida	Naididae			Branchjura	sowerbyi	5	50	10	27.78
F-2-1	Arthropoda	Insecta	Diptera	Ceratopogonidae		0 111	Ceratopogon	sp.	3	50	6	16.67
F-2-1	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	Coelotanypus	scapularis	1	50	2	5.56
F-2-1	Arthropoda	Insecta	Diptera	Ceratopogonidae			Bezzia	sp.	1	50	2	5.56
F-2-1	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	sp.	1	50	2	5.56
F-2-2	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon	sp.	12	50	24	33.33
F-2-2	Annelida	Oligochaeta	Tubificida	Naididae			Branchiura	sowerbyi	8	50	16	22.22
F-2-2	Arthropoda	Insecta	Diptera	Ceratopogonidae			Sphaeromias	sp.	8	50	16	22.22
F-2-2	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	sp.	2	50	4	5.56
F-2-2	Arthropoda	Insecta	Hemiptera	Pleidae			Neoplea	sp.	2	50	4	5.56
F-2-2	Arthropoda	Insecta	Hemiptera	Mesoveliidae	<u></u>		Mesovelia	sp.	1	50	2	2.78
F-2-2	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Polypedilum	illinoense	<del> !</del>	50	2	2.78
F-2-2	Arthropoda	Insecta	Diptera	Ceratopogonidae	<u> </u>		Culicoides	sp.	1	50	2	2.78
F-2-2	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	L	Psectrolanypus	sp.	<del>  1</del>	50	2	2.78
F-2-3	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon	sp.	11	50	22	47.83
F-2-3	Annelida	Oligochaeta	Tubificida	Naididae			Branchiura	sowerbyi	9	50	18	39.13
F-2-3	Arthropoda	Insecta	Diptera	Ceratopogonidae	L		Sphaeromias	sp.	2	50	4	8.70
F-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Polypedilum	illinoense	1	50	2	4.35
F-3-1	Annelida	Oligochaeta	Tubificida	Naididae			Branchiura	sowerbyl	28	50	56	53.85
F-3-1	Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus	hoffmeisterl	14	50	28	26.92
F-3-1	Annelida	Oligochaeta	Tubificida	Tubificidae			llyodrilus	templetoni	3	50	6	5.77
F-3-1	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae		Krenopelopia	sp.	2	50	4	3.85
F-3-1	Arthropoda	Insecta	Coleoptera	Dytiscidae			Hygrotus	sp.	1	50	2	1.92
F-3-1	Arthropoda	Insecta	Diptera	Ceratopogonidae			Culicoldes	sp.	1	50	2	1.92
F-3-1	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Polypedilum	illinoense	1	50	2	1.92
F-3-1	Arthropoda	Insecta	Coleoptera	Hydrophilidae		<del></del>	Tropisternus	sp.	1	50	2	1.92
		Insecta	Diptera	Stratiomyidae	<del>                                     </del>	l	Stratiomys	sp.	1	50	2	1.92
F-3-1	Arthropoda	HISCOR	Dipicia	1 3000000		<del></del>		· · · · · · · · · · · · · · · · · · ·	<del></del>	<del></del>		

Appendix D

Benthic Macroinvertebrate Data for Dead Creek Sector F, the Borrow Pit Lake, and Reference Areas

Bauget Area 1

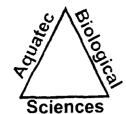
Nation ID	Phylum	Class	Order	Family	Bub-Family	Tribe	Genus	Species	Number of Organisms Counted	Amount of Sample	Sample Total	Relative Abundance (Percent)
F-3-2	Annelida	Oligochaeta	Tubificide	Tubificidae			Limnodrilus	holfmelsterl	31	50	62	45 59
F-3-2	Annelida	Oligochaeta	Tubificida	Naididae			Branchiura	aowerbyi	27	50	54	39 71
F-3-2	Annelida	Oligochaeta	Tubificida	Tubificidae			Hyodrifus	Ismpletoni	2	60	4	2 94
F-3-2	Arthyopoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Polypeditum	Minoense	$\frac{1}{2}$	60	1	2 94
F-3-2	Mollusca	Gastropoda	Basommatophora	Physidae	0		Physelle	heleroelrophe		50	1	294
			Tubificida	Tubificidae			Dero		<del></del>	50	<del></del>	147
F-3-2	Annelida _	Oligochaeta Insecta	Hemiptera	Corixidae	Cortringe	<del></del>	Yrichocorixa	vege	<del></del>	80		147
F-3-2	Arthropoda			Caratopogonidae			Spheeromies	#0 #0	<del></del>	50	<del>-                                    </del>	
. <u>F-3-2</u>	Arthropoda	ineecta	Diptera	Yipuiidae			Tipulidee (family)		<del></del>	50		147
F-3-2	Arthropoda	Insecta	Diptera	Naididae					<del></del>		2	147
F-3-3	Annelida	Oligochaeta	Tubificida	Tubificidae			Branchiura	sowerbyl	24	50	62	44 07
F-3-3	Annelida	Oligochaeta	Tubificida		China	A 5 5	Limnodrikus	hoffmelsteri	11	50	22	18.64
F-3-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominas	Chironomini	Polypedilum	Minoense		50	20	16 96
F-3-3	Arthropoda	Insecta	Diplera	Ceratopogonidae			Sphaeromies	ap .	3	50	6	5.08
F-3-3	Arthropoda	insecta	Diptera				(Mptera (class)		3	50	6	<u> </u>
F-3-3	Arthropoda	Insecta	Diptora	Chironomidae	Tanypodinae		Krenopelopie	ερ	3	l 60	6	ñ Ōñ
F-3-3	Arthropoda	Insecta	Diptera	Tipulidae			i.imonie	ıρ	1	50	2	1 60
F-3-3	Arthropoda	Insecta	Diptora	Caratopogonidae			Ceretopogon	εp.		80	2	1 69
F-3-3	Mollusca	Gastropoda	Basommatophora	Physidae			Physella	heterostrophe	1	50	2	1 69
BP-1-1	Arthropoda	Insecta	Odonala	Libellulidas			Perthemis	ıρ	5	50	10	29 41
BP-1-1	Annelida	Otigochaeta	Tubificida	Naididae			Branchiura	sowerbyl	3	50	6	17 66
BP-1-1	Annelkia	Oligochaeta	Tubificida	Yublficidae			Limnodrijus	hoffmelsterl	3	50	6	17 65
8P-1-1	Arthropoda	Insecta	Hemiptera	Cortsidee	1		Palmacortxa	10	2	50	4	11.76
	- r	Hirudinea	Pheryngobdellida	Erpobdellidae		- f	Mooreobdella	microstoma	1	50	2	5.88
BP-1-1	Annelida						Ceretopogon	<b>ερ</b> .	1	80	1 2	5 68
BP-1-1	Arthropoda	Insecta	Diptera	Ceratopogonidae	Townsdage	Madacallai	Natarala		<del></del>	50	<del> </del>	5 88
BP-1-1	Arthropoda	insecta	Diptera	Chironomidae	Tanypodinee	Natarslini		- θρ	<del></del>	50	2	5.68
BP-1-1	Arthropoda	Insecta	Diptera	Chironomidae	Yanypodinae	Tanypodini	Tanypus	neopunctipennis	· · · · <u>}</u> · · · —	- <del> </del>	- 6	17 39
BP-1-2	Annelida	Oligochaeta	Tubificida	Tubificidae			Limn <b>odril</b> us	hoffmelsteri	<u>.</u> -	50	<u> </u>	
BP-1-2	Annelida	Oligochaeta	Tubificida	Naididae		ļ	Dero	digitala	3	50	6	13.04
BP-1-2	Arthropoda	Insecta	Homiptera	Cortxidae			Palmacorixa	ερ	3	50	6	13 04
BP-1-2	Annelida	Hirudinea	Pharyngobdellida	Erpobdellidae		ļ	Mooreobdella	microstoma	2	50	4	8 70
BP-1-2	Arthropoda	Insects	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	2	50	4	8 70
			Ephomeroptera	Caenidae	"	,, ,,	Caenis	Sp.	2	50	4	8.70
BP-1-2	Arthropoda	Insecta	Odonala	t ibeliulidae		į	Parithemia	Sp.	2	50	4	8 70
BP-1-2	Arthropoda	Insects	Tubificida	Naklidae		Į.	Aulodrilus	piqueli	1	50	2	4 35
BP-1-2	Annelida	Oligochaeta		Naididae			Branchlura	sowerbyl	1 1	50	2	4 35
BP-1-2	Annelida	Óligochaeta	Tubificida		Musicantiliana		Hydroptile	ajax	i 1	50	2	4 36
BP-1-2	Arthropoda	Insecta	Trichoptera	Hydroptilidae	Hydroptilinee	Attache mini		sp.	l i	50	2	4,35
BP-1-2	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Cryptolendipes		· <del></del>	50	2	4 35
BP-1-2	Arthropoda	Insecta	Odonala	Gomphidae	ł	i	Arigomphus	sp.	1 4	50	14	30.43
BP-1-3	Annelide	Óligochaeta	Tubificida	Tubificidae			Limnodrilus	hoffmelsteri	1 4	50	10	21 74
BP-1-3	Arthropoda	Insects	Hemiptera	Corixidae	Corixinae	1	Trichocorixa	aρ.	ļ <u>- 2</u>			8 70
		Insects	Diptera	Ceratopogonidae			Ceratopogon	aρ.	2	50	4	
BP-1-3	Arthropoda		Odonata	Libellulidae			Perithemia	aρ.	2	50	4	8.70
BP-1-3	Arthropoda	Insecta		Erpobdeliidae		ļ	Mooreobdella	microstoma	I <u>_1</u>	50	2	4.36
BP-1-3	Anneilda	Hirudines	Pharyngobdellida Tubificida	Tubificidae	í i		llyodrilus	templetoni	1 1	80	2	4.35
BP-1-3	Annelida	Oligochaeta		Naididae	1		Branchiura	sowerbyl	1	50	2	4.35
BP-1-3	Annelida	Oligochaeta	Tubificida				Caenia	8p.	1	60	2	4.35
BP-1-3	Arthropoda	Insects	Ephemeroptera	Caenidae			Berosus	<b>40</b> .	1	60	2	4.35
BP-1-3	Arthropoda	insecta	Coleoptera	Hydrophilidae		المناف مواقعة		neopunctipennia	1	80	2	4.35
BP-1-3	Arthropoda	Insects	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus		I .	80	1	4,35
BP-1-3	Nematoda	1	Dorylaimida			]	Alalmus	sp	27	50	54	47.37
BP-2-1	Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus	hoffmelsterl	- <del>2/</del>	50	12	10.63
BP-2-1	Annelida	Oligochaeta	Tublficida	Naididae			Dero	digitata	1		10	8.77
	Annelida	Oligochaeta	Tubificida	Tubificidae	ł	\	llyodrilus	templetoni	5	60		
BP-2-1		Oligochaeta	Tubificida	Naididae			Aulodrilus	pigueti	4	50	8	7.02
BP-2-1	Annelida		Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	stellatus	3	50	8	5.26
BP-2-1	Arthropoda	Insecta		Ceratopogonidae	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Ceratopogon	Sp.	3	50	6 _	5.26
BP-2-1	Arthropoda	Insecta	Diptera				Branchiura	sowerbyl	2	50	4	3.51
BP-2-1	Annelida	Oligochaeta	Tublficida	Naididae	Tames dises	Contoton-modific		sp.	2	50	4	3.51
BP-2-1	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	Clinolenypus		2	50	1 4	3.51
BP-2-1	Arthropoda		Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	1 :	50	2	1.75
BP-2-1	Arthropoda		Odonata	Gomphidae	.]	.,,,	Arigomphus	\$ρ.	1 1	50	~	1.75
BP-2-1 4	Yropoda		Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	selinarius	1 - 1 - 1		2	75
DF-2-1	ropoda		Diotera	Ceratopogonidae	(		Culicoides	sp.	J., <del>_</del>	50	2	

### Appendix D Benthic Macroinvertebrate Data for Dead Creek Sector F, the Borrow Pit Lake, and Reference Areas Sauget Area I

2 m. s		100	11在10年2月20日			ili.			Number of	(		and the second of the second o
Station ID	> Phylum	Class	Order	Family	Sub-Family	Tribe	Genus	Species	Organisms	Amount of Sample	Sample	Relative Abundance
BP-2-2	Annelida	Oligochaeta	Tublficida	Tubificidae		11100	Limnodrilus	hoffmeisteri	Counted 13	Analyzed (%)	Total	(Percent)
BP-2-2	Annelida	Oligochaeta	Tubificida	Tublficidae			liyodrilus	templetoni	4	50	26 8	44.83 13.79
BP-2-2	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	salinarius	3	50	6	
BP-2-2	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Procladiini	Procladius	SD.	3	50	6	10.34
BP-2-2	Annelida	Oligochaeta	Tubificida	Naididae			Branchiura	sowerbyi	2	50	4	10.34
BP-2-2	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	Clinotanypus	sp.	<del></del>	50	4	6.90
BP-2-2	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon	Sp.	1	50	2	
BP-2-2	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	<del></del>	50	2	3.45 3.45
BP-2-3	Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus	hoffmeisterl	18	50	36	40.00
BP-2-3	Arthropoda	Insecta	Diptera	Ceratopogonidae		<del></del>	Ceratopogon	sp.	7	50	14	
BP-2-3	Annelida	Oligochaeta	Tubificida	Naididae		*****	Dero	digitata	6	50	12	15,56 13.33
BP-2-3	Annelida	Oligochaeta	Tubificida	Naididae			Branchiura	sowerbyi	2	50	4	4.44
BP-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	decorus	- 2	50	4	4,44
BP-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Tanytarsini	Tanytarsus	sp.	2	50	4	
BP-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	stellatus	2	50	4	4.44
BP-2-3	Arthropoda	Insecta	Odonata	Gomphidae			Arigomphus	sp.	1	50	2	2.22
BP-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Cladopelma	sp.	1	50	2	2.22
BP-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	Clinotanypus	sp.	<del>- i -</del>	50	2	2.22
BP-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Procladiini	Procladius	sp.	<del>- i</del>	50	2	2.22
BP-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	1	50	2	2.22
BP-2-3	Arthropoda	Insecta	Diptera	Tipulidae			Tipulidae (family)		<del>- i -</del>	50	2	2.22
BP-3-1	Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus	hoffmeisteri	42	100	42	50.00
BP-3-1	Annelida	Oligochaeta	Tubificida	Naididae			Dero	digitata	16	100	16	19.05
BP-3-1	Annelida	Oligochaeta	Tubificida	Naididae			Branchiura	sowerbyi	9	100	9	10.71
BP-3-1	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon	sp.	5	100		5.95
BP-3-1	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	4	100	4	4.76
BP-3-1	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Cryptochironomus	fulvus	3	100	3	3.57
BP-3-1	Arthropoda	Insecta	Odonata	Libellulidae			Perithemis	sp.	2	100	2	2.38
BP-3-1	Annelida	Oligochaeta	Tubificida	Naididae			Aulodrilus	pigueti	1 -	100	1	1,19
BP-3-1	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	Clinotanypus	sp.	1	100	<del>i</del>	1.19
BP-3-1	Arthropoda	Insecta	Diptera	Ceratopogonidae	Tanypounds	Cociotanypodini	Sphaeromias	Sp.	<del> </del>	100	1	1,19
BP-3-1	Annelida		Tubificida	Tubificidae	i	<del></del>	Limnodrilus	hoffmeisteri	7	100	7	43.75
BP-3-2	Annelida	Oligochaeta	Tubificida	Naididae	<del> </del>		Branchiura	sowerbyi	- <u>;</u> -	100	2	12.50
BP-3-2	Annelida	Oligochaeta Oligochaeta	Tubificida	Naididae		<del> </del>	Dero	digitata	1	100	1	6.25
			Diptera	Ceratopogonidae			Ceratopogon	sp.	<del> </del>	100	1	6.25
BP-3-2	Arthropoda	Insecta		Libellulidae		<del></del>	Plathemis	sp.	<del></del>	100	<del></del>	6.25
BP-3-2	Arthropoda	Insecta	Odonata	Chironomidae	Chironominae	Tanytarsini	Tanytarsus	sp.	<del> </del>	100	1	6.25
BP-3-2	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	<del>                                     </del>	100	1	6.25
BP-3-2	Arthropoda	Insecta	Diptera	Libellulidae	Tarrypodinae	ranypooliii	Perithemis	sp.	<del> </del>	100	├ <del>─</del>	6.25
BP-3-2	Arthropoda	Insecta	Odonata				Sphaeromias	sp.	<del>                                     </del>	100	1	6.25
BP-3-2	Arthropoda	Insecta	Diptera	Ceratopogonidae	<del> </del>	<del> </del>	Limnodrilus	hoffmeisteri	36	100	36	70,59
BP-3-3	Annelida	Oligochaeta	Tubificida	Tubificidae	<u> </u>	<del></del>	Branchiura	sowerbyi	5	100	5	9.80
BP-3-3	Annelida	Oligochaeta	Tubificida	Naididae Naididae	<del>                                     </del>	<del> </del>	Dero	digitata	3	100	3	5.88
BP-3-3	Annelida	Oligochaeta	Tubificida		<del></del>	<del> </del>	Ceratopogon	sp.	2	100	2	3.92
BP-3-3	Arthropoda	Insecta	Diptera	Ceratopogonidae	<del> </del>	<del> </del>	Bezzia	sp.	<del></del> -	100	<del></del>	1.96
BP-3-3	Arthropoda	Insecta	Diptera	Ceratopogonidae	<del>                                     </del>	<del> </del>	Chaoborus	punctipennis	<del>                                     </del>	100	<del>                                     </del>	1.96
BP-3-3	Arthropoda	Insecta	Diptera	Chaoboridae	Chhanamhasa	Chironomini	Cryptochironomus	fulvus	1	100	<del> </del>	1.96
BP-3-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini			<del>                                     </del>	100	<del>                                     </del>	1.96
BP-3-3	Arthropoda	Insecta	Odonata	Libellulidae	Tanadaa	Tom	Perithemis	sp. neopunctipennis	<del>                                     </del>	100	<del>                                     </del>	1,96
BP-3-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tanypus		71	100	71	89.87
PDC-1-1	Annelida	Oligochaeta	Tubificida	Tubificidae	<del></del>	<del></del>	Limnodrīlus	hoffmeisteri				2.53
PDC-1-1	Annelida	Oligochaeta	Tubificida	Naididae	<del></del>	<del></del>	Dero	digitata	2	100	2	2.53
PDC-1-1	Annelida	Oligochaeta	Tubificida	Tubificidae		<b></b>	llyodrīlus	templetoni	2	100	2	2.53
PDC-1-1	Annelida	Oligochaeta	Tubificida	Tubificidae	<b></b>	<b></b>	Psammoryclides	californianus	2	100		
PDC-1-1	Arthropoda	Insecta	Diptera	Ceratopogonidae	<b></b>	<del> </del> -	Ceratopogon	sp.	<del> </del>	100	1	1.27
PDC-1-1	Arthropoda	Insecta	Diptera	Chaoboridae		<u> </u>	Chaoborus	punctipennis	1	100	1	1.27
PDC-1-2	Annelida	Oligochaeta	Tubificida	Tubificidae	L	L	Limnodrilus	hoffmeisteri	4	100	4	66.67
PDC-1-2	Arthropoda	Insecta	Diptera	Ceratopogonidae	<u> </u>	ļ <u>.</u>	Ceratopogon	sp.	11	100	1	16.67
PDC-1-2	Arthropoda	Insecta	Diptera	Ceratopogonidae		L	Bezzia	sp.	1	100		16.67
55046	Annelida	Oligochaeta	Tubificida	Tubificidae	<u> </u>	L	Limnodrilus	hoffmeisterl	4	100	4	57.14
PDC-1-3						,			2	100	2	28.57
PDC-1-3	Arthropoda	Insecta	Diptera	Ceratopogonidae	Tanypodinae	Tanypodini	Ceralopogon Tanypus	sp. neopunctipennis		100	<u> </u>	14,29

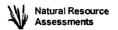
Appendix D Benthic Macroinvertebrate Data for Dead Creek Sector F, the Borrow Pit Lake, and Reference Areas Bauget Area I

į	l .	. 2" drie 4	"冷暖"。"冷心"			No. Company		il disasta	Number of	Amount of Sample	Sample	Relative Abundanc
			A DESTRUCTION OF THE PROPERTY OF	Family	Sub-Family	Tribe	Conus	Species	Counted	Analyzed (%)	Total	(Percent)
ation ID	mytum	Crane	Tubificide	Tubificidae	according at	- 11100	Limnodrilus	hoffmeisteri	3	100	1014	78.00
DC-2-1	Annelida	Oligochaeta	Prionodesmacea	Unionidae	1	l	Lampaille	AD .	1	100		25.00
DC-2-1	Mollusca	Pelecypoda	Tubificida	Tubificidae		1	Limnodrikus	hoffmeistert	30	100	30	83 33
DC-5-3	Annelida	Cligochaeta	Tubificida	Tubificidae	1	ł	Hyodrikus	Iompletoni	3	100	3	6 33
DC-2-2	Annelida	Oligochaeta	Tublificida	Naididae	ŀ		Dero	digitala		100	1	2 78
DC-2-2	Annelida	Oligochaeta Oligochaeta	Tubificida	Tubificidae			Psammaryclides	californianus	<del></del>	100	<del></del>	2 78
DC-2-2	Annelida Anthropoda	Crustacea	Decapoda	Palaemonidae			Palaemonetes	kadlakanala	<del></del>	100	<del></del>	278
DC-2-3	Annelida	Olioochaela	Tubificide	Tubificidae			Limnodrilus	hoffmeisteri	49	50	98	90 74
DC-2-3	Arthropoda	Insecta	Diptera	Cheoboridae			Cheoborus	punctipennia	2	50	4	3.70
DC-2-3	Annelida	Oligochaeta	Tubificida	Naididae	•		Dero	digitala		50	2	1 85
DC-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	decorus	<del>-</del>	50	3	1 85
DC-2-3	Arthropoda	insecta	Diptera	Chironomidae	Tanypodinae	Procladiini	Procladius	Ap.	<del> </del>	50	2	1.85
DC-2-3 CF2-1-1	Annelida		Tubificida	Tubificidae		* 100,000	l amnodrilus	hoffmelsteri	149	10	1490	90.86
EF2-1-1		Oligochaeta Insecta	Diptera	Ephydridae			Ephydra	aubopaca	6	10	60	3 66
	Arthropoda	insecta	Ototora	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	7	10	20	1 22
EF2-1-1	Arthropoda			Palaemonidae	, and bounded	· milypaama	Palaemonetes	kadlakensis	2	1	20	1 22
EF2-1-1	Arthropoda	Crustacea	Decapoda Basommatophora	Physidae			Physella	helerostropha		10	20	1 22
EF2-1-1	Mollusca	Gastropoda	Tubificida	Tubificidae			Neis	variabilis	<del>-</del>	10	10	061
EF2-1-1	Annelida	Oligochaela		Tubificidae			Limnodrilus	udekemienus	<del> </del>	10	10	0.01
EF2-1-1	Annelida	Oligochaeta	Tubificida						t — — <del>;</del>	10	10	061
EF2-1-1	Arthropoda	insecta	Diplera	Ceratopogonidae   Tubificidae		1	Ceralopogon Limnodrilus	<u>ap.</u> hoffmelsteri	116	10	1150	89 15
EF2-1-2	Annelida	Oligochaeta	Tubificida		1			heterostropha	3	10	30	2.33
EF2-1-2	Mollusca	Gastropoda	Basommatophora	Physidae			Physella	,	2	10	20	1 55
EF2-1-2	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon	#p	J - 2	10	20	1 55
F2-1-2	Arthropoda	Insecta	Hemiplera	Corixidae	Cortxinae		Trichocorixa	sp.	2	10	20	1 55
EF2-1-2	Arthropoda	Insects	Diptera	Chironomidae	Yanypodines	Tanypodini	Tanypus	neopunctipennis	! !	10	10	0.78
EF 2-1-2	Annelida	Oligochaeta	Tubificida	Tubificidae			Psammoryclides	californianus	1 !	10	10	0.78
EF2-1-2	Annelida	Oligochaeta	Tublficida	Naididae			Autodrifus	pluriseta	! !	10	10	0.78
EF 2-1-2	Arthropoda	insecta	Diptera	Coratopogonidae			Spheeromies	ŧρ	1 !	10	10	0.78
EF2-1-2	Arthropoda	Insecta	Diptera	Ceratopogonidae			Cuticoldes	<b>ερ</b> .	l :	10	10	0.78
EF2-1-2	Arthropoda	Insecta	Hemiptera	Corixidae	1		Sigere	<b>ερ</b> .	1	10	600	40 27
EF2-1-3	Arthropoda	Insecta	Diptera	Ceratopogonidae			Culicoldes	<b>₽</b> ₽	60		500	33 56
EF2-1-3	Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus	hoffmeisteri	50	10	• · · —	33 50 16 79
EF2-1-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	tanypus	neopunctipennia	28	10	280	3 36
EF2-1-3	Arthropoda	Insects	Diptera	Ceratopogonidae			Ceratopogon	₽¢	5	10	50	1.34
EF2-1-3	Annelida	Olipochaeta	Tubificida	Naididae	Ì		Aulodrifus	piurisela	2	10	20	0.67
EF2-1-3	Annelida	Oligochaeta	Tubificida	Naididae			Dero	digitala	!	10	10	0 67
EF2-1-3	Arthropoda	Insects	Hemiotera	Cortxidae	Corixinae		Trichocorixe	ap.	1 1	10	10	0.67
	Arthropoda	Insecta	Diptera	Ceratopogonidae		]	Bezzie	<b>e</b> p	11	10	10	
EF2-1-3	Arthropoda	Insecta	Diptera	Ceratopogonidae	Į.	ľ	Spheeromies	æρ.	1 1	10	10	0.67
EF2-1-3	Annelida	Oligochaeta	Tubificida	Tubificidae	1	ļ	Limnodriluz	hoffmelsterf	22	100	22	69 46
EF2-2-1		Insects	Diptera	Caratopogonidae	1	1	Ceretopogon	aρ.	8	100	8	21.62
EF2-2-1	Arthropoda		TubMicida	Naididae	i	1	Dero	digitala	1 1	100	1	2.70
EF2-2-1	Annelida	Oligochaela	Tubificida	Naididae			Aulodrilus	pigueti	1	100	1 1	2.70
EF2-2-1	Annelida	Oligochaeta	Diplera	Chironomidae	Tanypodinae	Tanypodini	Tanypus	neopunctipennis	1	100	1	2.70
EF2-2-1	Arthropoda	insects		Ceratopogonidae	15,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Spheeromias	ND.	1 7	100	1	2.70
EF2-2-1	Arthropoda	Insects	Diptera	Chironomidae	Chironominae	Tanytaraini	Tanylaraus	Sp.	] 1	100	1	2.70
EF2-2-1	Arthropoda	Insects	<u>Diplera</u>	Tipulidae		,,	Ormosia	8D.	1 1	100	1	2.70
EF2-2-1	Arthropoda	insect <u>a</u>	Diptera	Chironomidae	Orthocladiinae	Orthocladiini	Paecirociadius	80.	1 1	100	1	2.70
EF2-2-1	Arthropoda	insecta	Diptera		CHIRCHEOMISE		Limnodrilus	hoffmelateri	13	100	13	92.66
EF2-2-2	Annelida	Oligochaeta	Tublficida	Tubificidae	Tommadasa	Pentaneurini	Abiebesmyla	annulata	1 1	100	1	7,14
EF2-2-2	Arthropoda	insecta	Diptera	Chironomidae	Tanypodinae	- WINGINGUINI	Limnodritus	hoffmeisteri	25	100	28	89.44
EF2-2-3	Annelida	Oligochaeta	Tubificids	Tubificidae		Chlor-control		salinarius	8	100	8	22.22
REF2-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus	scaleenum	1 1	100	1 1	2.78
REF2-2-3	Arthropoda	Insecta	Diptera	Chironomidae _	Chironominae	Chironomini	Polypedilum	neopunctipennis		100	1 1	2.78
REF2-2-3	Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Tanypodini	Tenypus	neopunctipennis ερ.	<del>                                     </del>	100 -	1 1	2.78
REF2-2-3	Arthropoda	Insecta	Hemiptera	Corixidae	Corixinae	I	Trichocorixa	- ap.	1	.L <del></del>	1	











Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 13012

Client Sample ID

: F-1-1-"CREEK SECTOR F-1"

Remarks

Date/Time Sample Collected : 10/7/99 @ 3:00:00 P

Percent Sample Examined

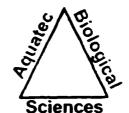
Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counter
Annelida	Oligochaeta	Tubificida	Naididae			Haemonais waldvogeli	1
			Tubificidae			Branchiura sowerbyi	3
						Limnodrilus claparedianus	1
ilusca	Pelecypoda	Prionodesmacea	Sphaeriidae			Sphaerium sp.	2
Arthropoda	Insecta	Coleoptera	Hydrophilidae			Hydrochus sp.	1
		Diptera	Ceratopogonidae			Ceratopogon sp.	1
						Culicoides sp.	3
			Chironomidae	Chironominae	Chironomini	Chironomus sp.	1
						Chironomus decorus	1
						Einfeldia sp.	4
						Polypedilum illinoense	5
				Tanypodinae	Tanypodini	Tanypus carinatus	1
		Hemiptera	Pleidae			Neoplea sp.	1
		Lepidoptera	Pyralidae			Acentria sp.	1
						Sub-Tota	l: 26
						Grand Tota	<i>l</i> : 26

**ABS** 

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Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET.IL

Laboratory Sample ID : 13013

Remarks

Client Sample ID

: F-1-2-"CREEK SECTOR F-1"

Date/Time Sample Collected : 10/7/99 @ 3:00:00 P

Percent Sample Examined

Sampling Depth (m)

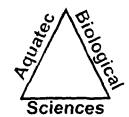
: Not Reported

_	Phylian	Cless	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	Counted
	Amelda	Oligochaeta	Tubificida	Tubificidae			Limnodrilus daparedianus	1
	Molusca	Pelecypoda	Prionodes/naces	Sphaeradae			Sphaenum sp.	8
	Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	1
				Chironomidae	Chironominae	Chironomini	Chironomus sp.	4-
							Polypedilum illinoense	_
							<del></del>	

Sub-Total: Grand Total:

**ABS** 

Page 68 of 74











Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 13014

Client Sample ID

: F-1-3-"CREEK SECTOR F-1"

Remarks

**Date/Time Sample Collected** 

: 10/7/99 @ 3:00:00 P

Percent Sample Examined

: 50

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			Branchiura sowerbyi	5
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			Musculium sp.	4
						Sphaerium sp.	3
thropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	1
						Culicoides sp.	4
			Chironomidae	Chironominae	Chironomini	Chironomus sp.	2
						Polypedilum illinoense	2
				Tanypodinae	Tanypodini	Tanypus neopunctipennis	1
						Sub-Total:	22
						Grand Total:	22











Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

**Date** 

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 13015

Client Sample ID

Remarks

: F-2-1-"CREEK SECTOR F-2"

Date/Time Sample Collected : 10/7/99 @ 4:10:00 P

Percent Sample Examined

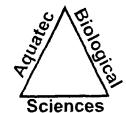
Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			Branchiura sowerbyi	5
Artivopoda	Insects	Diotera	Ceratopogonidae			Bezzia sp.	1
						Ceratopogon sp.	3
						Sphaeromias sp.	-
			Chironomidae	Chironominae	Chironomini	Chironomus sp.	· _ ·
				Tanypodinae	Coelotanypodini	Coelotanypus scapularis	1
						Sub-Total:	18
						Grand Total:	18

**ABS** 

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**Charlie Menzie** 

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

**Date** 

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 13016

Client Sample (D

: F-2-2-"CREEK SECTOR F-2"

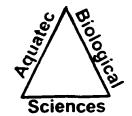
Remarks

Date/Time Sample Collected : 10/7/99 @ 4:10:00 P

Percent Sample Examined

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Sp	ecies/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			Branchiura sowe	rbyi	8
Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.		12
						Culicoides sp.		1
						Sphaeromias sp.		8
			Chironomidae	Chironominae	Chironomini	Chironomus sp.		2
						Polypedilum illind	ense	1
				Tanypodinae		Psectrotanypus s	p.	1
		Hemiptera	Mesoveliidae			Mesovelia sp.		1
			Pleidae			Neoplea sp.		2
						<b>-</b>	Sub-Total:	36
							Grand Total:	36











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Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 13017

Client Sample ID

Remarks

: F-2-3-TCREEK SECTOR F-2T

Date/Time Sample Collected : 10/7/99 @ 4:10:00 P

Percent Sample Examined

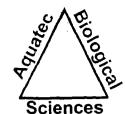
Sampling Depth (m)

: Not Reported

Phylon	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	Counted
Annelida	Oligochaeta	Tublicda	Tubificidae			Branchiura sowerbyi	9
Artwopoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	11
						Sphaeromias sp.	2
			Chiranomidae	Chironominae	Cheronomeni	Polypedilum illinoense	1
						Sub-Total	
						Grand Total	: 23

**ABS** 

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1 Courthouse Lane

Chelmsford, MA 01824

**Date** 

: 12/23/99

BTR No.

: 03703

Project No.

No. of Samples: 69

: 99033

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 13018

Client Sample ID

: F-3-1-"CREEK SECTOR F-3"

Remarks

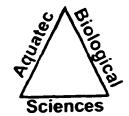
Date/Time Sample Collected : 10/7/99 @ 10:45:00

Percent Sample Examined

: 50

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counte
Annelida	Oligochaeta	Tubificida	Tubificidae			Branchiura sowerbyi	28
						llyodrilus templetoni	3
						Limnodrilus hoffmeisteri	14
thropoda	insecta	Coleoptera	Dytiscidae			Hygrotus sp.	1
			Hydrophilidae			Tropisternus sp.	1
		Diptera	Ceratopogonidae			Culicoides sp.	1
			Chironomidae	Chironominae	Chironomini	Polypedilum illinoense	1
				Tanypodinae		Krenopelopia sp.	2
			Stratiomyidae			Stratiomys sp.	1
						Sub-Total	: 52
		<del> </del>				Grand Total	: 52











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Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID: 13019

: F-3-2-TCREEK SECTOR F-3"

Remarks

Client Sample ID

Date/Time Sample Collected : 10/7/99 @ 10:45:00

Percent Sample Examined

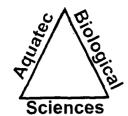
Sampling Depth (m)

: Not Reported

Annelida Oligochieta Tubificida Naridiae Dero vaga  Tubificidae Branchiura sowerbyi Byodrilus templetoni Lumnodrilus hoffmeisi Mollusca Gastropoda Basommatophora Physidae Physidae Physiella heterostropi Artivopoda Insecta Diptera Ceratopogonidae Chironomina Polypedilum illinoens	
Tubilicidae Branchiura sowerbyi Byodnitus templetoni Limnodritus holfmeisi Mollusca Gastropoda Basonimatophora Physidae Physidae Physella heterostropi Arthropoda Insecta Diptera Ceratopogonidae Sphaeromias sp.	
Mollusca Gasaropoda Basommatophora Physidae Physidae Physida Physida Physidae Sphaeromias sp.	1
Lumnodritus hoffmeist  Mollusca Gassropoda Basommatophora Physidae Physidae Physida heterostropi  Arthropoda Insecta Diptera Ceratopogonidae Sphaeromas sp.	27
Mollusca Gassropoda Basommatophora Physidae Physidae Physidae Arthropoda Insecta Diptera Ceratopogonidae Sphaeromias sp.	2
Arthropoda Insecta Diptera Ceratopogonidae Sphaeromias sp.	eri 🤫
	a
Chronomidae Chironominae Chironomini Polypedilum illinoens	1
	e 2
Tipulidae	1
Hemplera Consodae Consonae Trichoconica sp.	1
<del></del>	Sub-Total: 68
G	rand Total: 68

**ABS** 

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**Charlie Menzie** 

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1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12965

Client Sample ID

: F-3-3-"CREEK SECTOR F-3"

Remarks

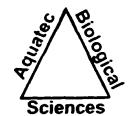
Date/Time Sample Collected

: 10/7/99 @ 10:45:00

Percent Sample Examined

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/V	ariety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			Branchiura sowerbyi		26
						Limnodrilus hoffmeisteri		11
Mollusca	Gastropoda	Basommatophora	Physidae			Physella heterostropha		1
ropoda	Insecta	Diptera						3
			Ceratopogonidae			Ceratopogon sp.		1
						Sphaeromias sp.		3
			Chironomidae	Chironominae	Chironomini	Polypedilum illinoense		10
				Tanypodinae		Krenopelopia sp.		3
			Tipulidae			Limonia sp.		1
						Su	b-Total:	59
						Gran	d Total:	59











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Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET.IL

Laboratory Sample ID : 12965

Remarks

Client Sample ID

: BP-1-1-"BORROW PIT LAKE-1"

Date/Time Sample Collected : 10/6/99 @ 11:30:00

Percent Sample Examined

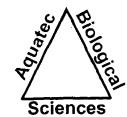
Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annalida	Hirudines	Pharyngobdellida	Erpobdellidae			Mooreobdelle microstoma	
Attends		-	Сримения			mud ecocess inscressorie	,
	Oligochaeta	Tubificida	Tubificidae			Branchiura sowerbyi	3
						Limnodrilus holimeisteri	3
Artivopoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	•
			Chironomidae	Tanypodinae	Natarsini	Natarsia sp.	<b>~</b> ′
					Tanypodini	Tanypus neopunctipennis	1
		Hemplera	Conxidae			Palmaconira sp.	2
		Odonata	Libellulidae			Perithernis sp.	5
						Sub-Total:	17
						Grand Total	17

**ABS** 

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**Charlie Menzie** 

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

**Date** 

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12986

Client Sample ID

Remarks

: BP-1-2-"BORROW PIT LAKE -1"

Date/Time Sample Collected

: 10/6/99 @ 11:30:00

Percent Sample Examined

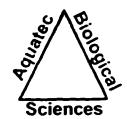
Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Pharyngobdellida	Erpobdellidae			Mooreobdella microstoma	2
	Oligochaeta	Tubificida	Naididae			Dero digitata	3
			Tubificidae			Aulodrilus pigueti	1
						Branchiura sowerbyi	1
						Limnodrilus hoffmeisteri	4
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Cryptotendipes sp.	1
			·	Tanypodinae	Tanypodini	Tanypus neopunctipennis	2
		Epherneroptera	Caenidae			Caenis sp.	2
		Hemiptera	Corixidae			Palmacorixa sp.	3
,		Odonata	Gomphidae			Arigomphus sp.	1
			Libellulidae			Perithemis sp.	2
		Trichoptera	Hydroptilidae	Hydroptilinae		Hydroptila ajax	1
						Sub-Total:	23
						Grand Total:	23

**ABS** 

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Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane Chelmsford, MA 01824 Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12987

: 1/290/

Remarks

Client Sample ID

: BP-1-3-"BORROW PIT LAKE-1"

Date/Time Sample Collected

: 10/6/99 @ 11:30:00

Percent Sample Examined : 50

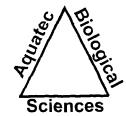
Sampling Depth (m)

: Not Reported

Phylom	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Dorylamida				Alaimus sp.	1
Annelida	Hrudines	Pharyngobdellida	Erpobdellidae			Mooreobdella microstoma	1
	Oligochaeta	Tubificida	Tubificidae			Branchiura sowerbyi	1
						Byodnius templetoni	1
						Limnodrilus hollimeisteri	
Arthropoda	Insects	Coleoptera	Hydrophilidae			Berosus sp.	1
		Dictera	Ceratopogonidae			Ceratopogon sp.	2
			Chiranomidae	Tanypodinae	Tanypodini	Tarrypus neopunctipennis	1
		Ephemeroptera	Caemdae			Caenis sp.	1
		Hemptera	Commdae	Conxinae		Trichocorica sp.	5
		Otionata	Libelluidae			Perithemis sp.	2
						Sub-Total	23
						Grand Total	23

**ABS** 

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**Charlie Menzie** 

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12995

Client Sample ID

Remarks

: BP-2-1-"BORROW PIT LAKE-2"

Date/Time Sample Collected : 10/6/99 @ 9:30:00 A

Percent Sample Examined

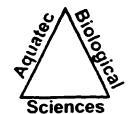
Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counter
Annelida	Oligochaeta	Tubificida	Naididae			Dero digitata	6
			Tubificidae			Aulodrilus pigueti	4
						Branchiura sowerbyi	2
						llyodrilus templetoni	5
						Limnodrilus hoffmeisteri	27
Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	3
						Culicoides sp.	1
			Chironomidae	Chironominae	Chironomini	Chironomus salinarius	1
				Tanypodinae	Coelotanypodini	Clinotanypus sp.	2
					Tanypodini	Tanypus neopunctipennis	2
						Tanypus stellatus	3
		Odonata	Gomphidae			Arigomphus sp.	1
						Sub-Total	: 57
						Grand Total	: 57

ABS

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Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12968

Client Sample ID

: BP-2-2-TBORROW PIT LAKE-2T

Remarks

Date/Time Sample Collected : 10/6/99 @ 9:30:00 A

Percent Sample Examined

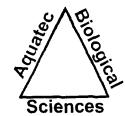
Sampling Depth (m)

: Not Reported

Phylesia	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelica	Oligochaeta	Tubifoda	Tubficidae			Branchiura sowerbyi	2
						Byodrikus templetoni	4
						Limnodrilus holimeisteri	13
Artivopoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	4
			Chironomidae	Chironominae	Chironomini	Chironomus salinarius	
				Tanypodinae	Coelotanypodini	Clinotanypus sp.	2
					Procladim	Procladius sp.	3
					Tanypodini	Tanypus neopunctipennis	1
			_	_		Sub-Total:	29
						Grand Total:	29

**ABS** 

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Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12989

Client Sample ID

Remarks

: BP-2-3-"BORROW PIT LAKE-2"

Date/Time Sample Collected : 10/6/99 @ 9:30:00 A

Percent Sample Examined

Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			Dero digitata	6
			Tubificidae			Branchiura sowerbyi	2
						Limnodrilus hoffmeisteri	18
hropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	7
			Chironomidae	Chironominae	Chironomini	Chironomus decorus	2
						Cladopelma sp.	1
					Tanytarsini	Tanytarsus sp.	2
				Tanypodinae	Coelotanypodini	Clinotanypus sp.	1
					Procladiini	Procladius sp.	1
					Tanypodini	Tanypus neopunctipennis	1
						Tanypus stellatus	2
			Tipulidae				1
		Odonata	Gomphidae			Arigomphus sp.	1
						Sub-Tota	ıl: 45
						Grand Total	al: 45

**ABS** 

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Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID: 12992

Client Sample ID Remarks

: BP-3-1-"BORROW PIT LAKE-3"

Date/Time Sample Collected : 10/6/99 @ 4:30:00 P

Percent Sample Examined

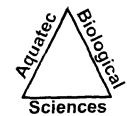
Sampling Depth (m)

: Not Reported

Phylen	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochiaeta	Tubficida	Nadidae			Dero digitata	16
			Tubificidae			Autodnitus pigueti	1
						Branchiura sowerbyi	9
						Limnodnius holimeisteri	4^
Arthropoda	Insecta	Osptera	Ceratopogonidae			Ceratopogon sp.	•
						Sphaeromias sp.	1
			Cheronomedae	Chironominae	Chironomini	Cryptochironomus fulvus	3
				Tanypodinae	Coelotanypodini	Clinotarrypus sp.	1
					Tanypodini	Tanypus neopunctipennis	4
		Odonata	Libellulidae			Perithemis sp.	2
						Sub-Total	: 84
				<u> </u>		Grand Total	: 84
			<del></del>				

**ABS** 

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Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane Chelmsford, MA 01824 **Date** 

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12990

Client Sample ID

: BP-3-2-"BORROW PIT LAKE-3"

Remarks

Date/Time Sample Collected

: 10/6/99 @ 4:30:00 P

Percent Sample Examined

: 100

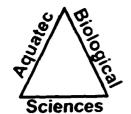
Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counter
Annelida	Oligochaeta	Tubificida	Naididae			Dero digitata	1
			Tubificidae			Branchiura sowerbyi	2
						Limnodrilus hoffmeisteri	7
ropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	1
						Sphaeromias sp.	1
			Chironomidae	Chironominae	Tanytarsini	Tanytarsus sp.	1
				Tanypodinae	Tanypodini	Tanypus neopunctipennis	1
		Odonata	Libellulidae			Perithemis sp.	1
			e			Plathemis sp.	1
				_		Sub-Total	: 16
						Grand Total	: 16

**ABS** 

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**Date** 



: 12/23/99

: 03703

: 99033

Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane Cheimsford, MA 01824 BTR No. Project No.

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID: 12991

: BP-3-3-"BORROW PIT LAKE-3" Client Sample ID

Remarks

Date/Time Sample Collected : 10/6/99 @ 4:30:00 P : 100

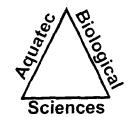
Percent Sample Examined Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
	24	Tubifoda	Naidde			One forther	
Armelide	Oligocheella	( GOMCOGS	Naturale			Dero digitata	3
			Tubificidae			Branchiura sowerbyi	5
						Limnodrilus holfmeisteri	36
Arthropoda	Insects	Diptera	Ceratopogonidae	•		Bezzia sp.	4
						Ceratopogon sp.	_
			Chaobondae			Chaoborus punctipennis	1
			Chironomidae	Chironominae	Chironomini	Cryptochironomus fulvus	1
				Tanypodinae	Tanypodini	Tanypus neopunctipennis	1
		Odonata	Libellulidae			Perithemis sp	1
				_		Sub-Total:	51
						Grand Total:	51

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Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12979

Client Sample ID

Remarks

: PDC-1-1-"PRARIE DUPONT CREEK-1"

Date/Time Sample Collected

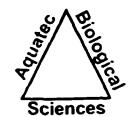
: 10/8/99 @ 9:30:00 A

Percent Sample Examined

: 100

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			Dero digitata	2
			Tubificidae			llyodrilus templetoni	2
						Limnodrilus hoffmeisteri	71
						Psammoryctides californianus	2
Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	1
			Chaoboridae			Chaoborus punctipennis	1
						Sub-Total:	79
						Grand Total:	79











Charlie Menzie

Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

**Project No.** 

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12980

Client Sample ID

Remarks

: PDC-1-2-"PRARIE DUPONT CREEK-1"

Date/Time Sample Collected : 10/8/99 @ 9:30:00 A

Percent Sample Examined

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Spe	cies/Variety	# Counted
Amelda	Oligochesta	Tubificida	Tubificidae			Limnodrilus holima	eisteri	4
Arthropoda	Insecta	Diptera	Ceratopogonidae			Bezzia sp.		1
						Ceratopogon sp.		1
						_	Sub-Total:	6
							Grand Total:	











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1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12981

Client Sample ID

Remarks

: PDC-1-3-"PRARIE DUPONT CREEK-1"

Date/Time Sample Collected : 10/8/99 @ 9:30:00 A

Percent Sample Examined

: 100

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus hoffmeisteri	4
Arthropoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	2
			Chironomidae	Tanypodinae	Tanypodini	Tanypus neopunctipennis	1
						Sub-Total:	7
						Grand Total:	7











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Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

**Date** 

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12982

Client Sample ID

Remarks

: PDC-2-1-"PRARIE DUPONT CREEK-2"

Date/Time Sample Collected : 10/8/99 @ 11:20:00

Percent Sample Examined

: 100

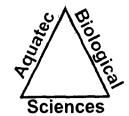
Sampling Depth (m)

: Not Reported

Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	Counted
Oligochesta	Tubificida	Tubificidae			Limnodrilus holfmeisteri	3
Pelecypoda	Prioriodesmacas	Unionidae			Lampsilis sp.	1
					Sub-Total:	4
					Grand Total:	4
	Oligochesta	Oligocheeta Tubificida	Oligochesta Tubificida Tubificidae	Oligochesta Tubificida Tubificidae	Oligochesta Tubificida Tubificidae	Oligochiesta Tubificida Tubificidae Limnodrilus holfmeisteri Pelecypoda Prionodesmace Unionidae Lampsilis sp.  Sub-Total:

**ABS** 

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1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12983

Client Sample ID

Remarks

: PDC-2-2-"PRARIE DUPONT CREEK-2"

Date/Time Sample Collected

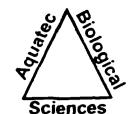
: 10/8/99 @ 11:20:00

Percent Sample Examined

: 100

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			Dero digitata	1
			Tubificidae			llyodrilus templetoni	3
						Limnodrilus hoffmeisteri	30
Malau i						Psammoryctides californianus	1
Arthropoda	Crustacea	Decapoda	Palaemonidae			Palaemonetes kadiakensis	1
						Sub-Total:	36
						Grand Total:	36











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Menzie-Cura & Associates

1 Courthouse Lane

Cheimsford, MA 01824

**Date** 

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID: 12984

Client Sample ID

: PDC-2-3-"PRARIE DUPONT CREEK-2"

Remarks

Date/Time Sample Collected : 10/8/99 @ 11:20:00

Percent Sample Examined

: 50

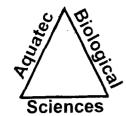
Sampling Depth (m)

: Not Reported

Ptrylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificita	Nardidae			Dero digitata	1
			Tubificidae			Limnodrilus holimeisteri	49
Artivopoda	Insecta	Diptera	Chaobondae			Chaobarus punctipennis	2
			Charonomidae	Chironominae	Chironomini	Chironomus decorus	1
				Tanypodinae	Procladimi	Procladius sp.	)
						Sub-Total:	54
			-			Grand Total:	54

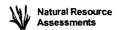
**ABS** 

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1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12973

Client Sample ID

Remarks

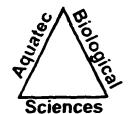
: REF2-1-1-"REFERENCE LOCATION 2-1"

Date/Time Sample Collected : 10/8/99 @ 2:30:00 P

Percent Sample Examined

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			Nais variabilis	1
			Tubificidae			Limnodrilus hoffmeisteri	149
						Limnodrilus udekemianus	1
lusca	Gastropoda	Basommatophora	Physidae			Physella heterostropha	2
Arthropoda	Crustacea	Decapoda	Palaemonidae			Palaemonetes kadiakensis	2
	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	1
			Chironomidae	Tanypodinae	Tanypodini	Tanypus neopunctipennis	2
			Ephydridae			Ephydra subopaca	6
						Sub-Total:	164
<del></del>						Grand Total:	164











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1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID: 12974

Client Sample ID

Remarks

: REF2-1-2-"REFERENCE LOCATION 2-1"

Date/Time Sample Collected

: 10/8/99 @ 2:30:00 P

Percent Sample Examined

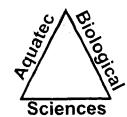
Sampling Depth (m)

: Not Reported

Phylam	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			Autodnius pluriseta	1
						Limnodrilus hollimeisteri	115
						Psammoryctides californianus	1
Mohisca	Gastropoda	Basommatophora	Physiciae			Physelle heterostropha	2
Artivopoda	Insecta	Diptera	Ceratopogonidae			Ceratopogon sp.	*
						Culicoides sp.	1
						Sphaeromias sp.	1
			Chironomidae	Tanypodinae	Tanypodini	Tanypus neopunctipennis	2
		Нетпрвега	Contradae			Signara sp	1
				Conxinae		Trichocorixa sp.	2
						Sub-Total:	129
						Grand Total:	129

**ABS** 

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Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12975

Client Sample ID

Remarks

: REF2-1-3-"REFERENCE LOCATION 2-1"

Date/Time Sample Collected : 10/8/99 @ 2:30:00 P

Percent Sample Examined

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			Dero digitata	1
			Tubificidae			Aulodrilus pluriseta	2
						Limnodrilus hoffmeisteri	50
ropoda	Insecta	Diptera	Ceratopogonidae			Bezzia sp.	1
						Ceratopogon sp.	5
						Culicoides sp.	60
						Sphaeromias sp.	1
			Chironomidae	Tanypodinae	Tanypodini	Tanypus neopunctipennis	28
		Hemiptera	Corixidae	Corixinae		Trichocorixa sp.	1
						Sub-Total:	149
						Grand Total:	149











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Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID: 12976

Client Sample ID

: REF2-2-1-TREFERENCE LOCATION 2-2

Remarks

Date/Time Sample Collected : 10/9/99 @ 10:30:00

Percent Sample Examined

: 100

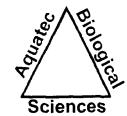
Sampling Depth (m)

: Not Reported

Ptrylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	Counted
						_	
Annelida	Oligochaeta	Tubificida	Naddae			Dero digitata	1
			Tubiliodae			Aulodrilus pigueti	1
						Limnodritus hoffmeisten	22
Artivopoda	Ingecta	Diplera	Ceratopogonidae			Ceratopogon sp.	٥
						Sphaeromias sp.	
			Chironomidae	Chironominae	Tanytarsini	Tarrytarsus sp.	1
				Orthoctadimae	Orthocladim	Psectrocladius sp.	1
				Tanypodinae	Tanypodini	Tanypus neopunctipennis	1
			Tipulidae			Ormosva sp.	1
						Sub-Total:	: 37
						Grand Total:	: 37

**ABS** 

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**Charlie Menzie** 

Menzie-Cura & Associates

1 Courthouse Lane Chelmsford, MA 01824 Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID : 12977

Client Sample ID

Remarks

: REF-2-2-"REFERENCE LOCATION 2-2"

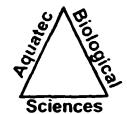
Date/Time Sample Collected : 10/9/99 @ 10:30:00

Percent Sample Examined

: 100

Sampling Depth (m)

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	Counter
Annelida	Oligochaeta	Tubificida	Tubificidae			Limnodrilus hoffmeisteri	13
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Pentaneurini	Ablabesmyia annulata	1
						Sub-Total:	14
						Grand Total:	14





: REF-2-3-TREFERENCE LOCATION 2-2T







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Menzie-Cura & Associates

1 Courthouse Lane

Chelmsford, MA 01824

Date

: 12/23/99

BTR No.

: 03703

Project No.

: 99033

No. of Samples: 69

Date Received: 10/26/99

Reference: SAUGET,IL

Laboratory Sample ID: 12978

Client Sample ID

Remarks

Date/Time Sample Collected : 10/9/99 @ 10:30:00

Percent Sample Examined

: 100

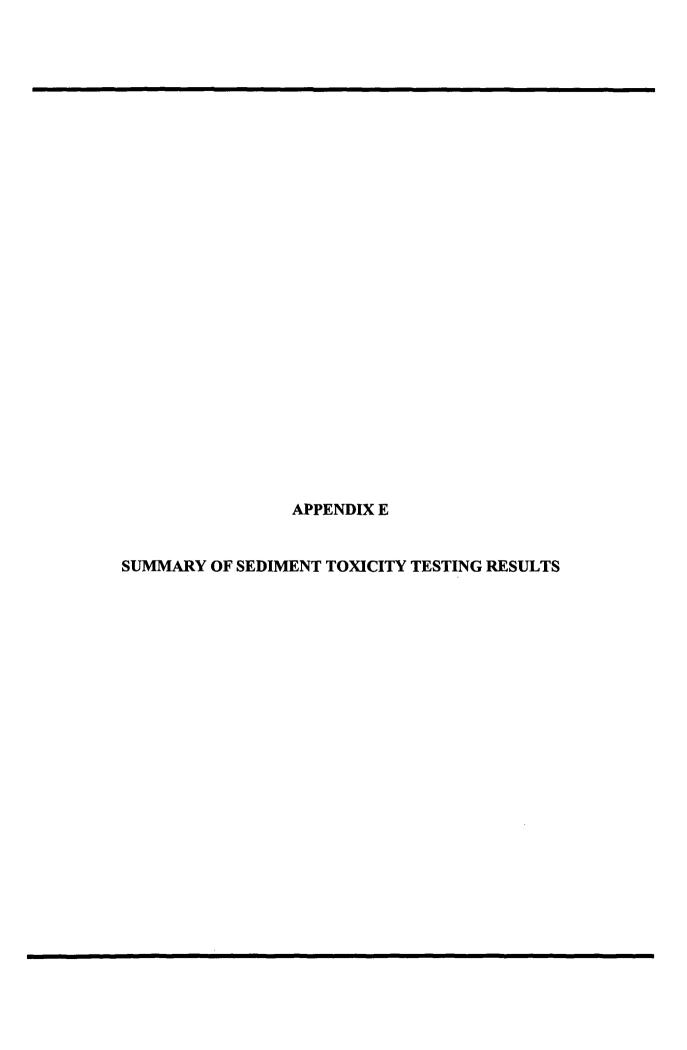
Sampling Depth (m)

: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arnelida	Oligochiaeta	Tubificita	Tublicate			Lumnodnius holimeisteri	26
ATTENDED.	Ogoles	100-006	10040000				25
Artivopoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	Chironomus salinarius	8
						Polypedilum scalaenum	1
				Tanypodinae	Tanypodini	Tanypus neopunctipennis	1
		Hemptera	Corondae	Conxinae		Trichocorixa sp.	_
						Sub-Total:	36
						Grand Total:	36

**ABS** 

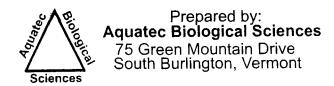
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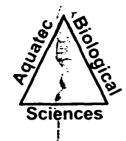
# Results of Hyalella azteca Survival and Growth Sediment Toxicity Tests Conducted on Sediment Samples from Dead Creek / Sauget, Illinois

Reference BTRs 3615, 3622, 3629, 3633, 3641, 3643

Prepared for: Menzie-Cura & Associates 1 Courthouse Lane, Suite 2 Chelmsford, MA 01824

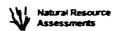


December 1999











BTRS 3615, 3622, 3629, 3633, 3641, 3643

**PROJECT:** 99033

I have reviewed this data package, which was completed under my supervision. This data package is complete, and to the best of my ability, accurately reflects the conditions and the results of the reported tests.

John W. Williams

Toxicity Laboratory Manager

Date

I have reviewed and discussed this data package with the responsible laboratory manager. Based on this review, the data package was, to the best of my knowledge and belief, conducted in accordance with established company quality assurance procedures.

Philip C. Downey, Ph.D.

Director

Date

#### TABLE OF CONTENTS

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APPENDIX B:	CHAIN-OF-CUSTODY DOCUMENTATION
APPENDIX C:	LABORATORY DOCUMENTATION AND DATA ANALYSES FOR Hyalella azteca TOXICITY TESTS
APPENDIX D:	RESULTS OF STANDARD REFERENCE TOXICANT TESTS

#### **EXECUTIVE SUMMARY**

# 100.1HASG Amphipod, Hyalella azteca 10 Day Survival and Growth Test Conducted October 7 - October 31, 1999 for Menzie-Cura & Associates Dead Creek Site

Laboratory Sample ID	Client Sample ID	Mean Survival (%)	<b>M</b> ean Dry Weight (mg)
12546	BTOX-C-1	90	0.080*
12547	BTOX-C-2	71	0.064*
12548	BTOX-C-3	68*	
12549	BTOX-D-1	90	0.172
12550	BTOX-D-2	88	0.134*
12551	BTOX-D-3	90	0.168
12552	Laboratory Control Sediment	86	0.223
12589	BTOX-B-1	16 <sup>-</sup>	
12590	BTOX-B-1 (DUPE)	19⁼	
12591	BTOX-B-2	1*	
12592	BTOX-B-3	64*	
12593	BTOX-M	10*	
12609	E-1 Dead Creek	23*	
12610	E-2 Dead Creek	76	0.664
12611	E-3 Dead Creek	85	0.141*
12612	BP-1 Borrow Pit	89	0.156*
12613	BP-1 Borrow Pit (DUPE)	94	0.154*
12614	BP-3 Borrow Pit	91	0.154*
12622	Laboratory Control Sediment	86	0.202
12638	BP-2 Borrow Pit	96	0.172
12639	F-1 Dead Creek Section F	91	0.221
12640	F-2 Dead Creek Section F	86	0.219
12641	F-3 Dead Creek Section F	83	0.183
12664	Prairie DuPont Creek	98	0.254
12665	Prairie DuPont Creek 2	98	0.404
12666	Reference Creek	98	0.393
12668	Laboratory Control Sediment	98	0.268
12671	Ref 2-2 Reference Borrow Pit	98	0.335

<sup>\*</sup> The response data were statistically significantly different from the corresponding laboratory control sediment (p ≤ 0.05)

<sup>--</sup> When a significant reduction in survival was detected mean only weight data were only reported in Appendix A (See Results)

#### **INTRODUCTION:**

Samples were received for toxicity testing at Aquatec Biological Sciences of 75 Green Mountain Drive, South Burlington, Vermont. Tests were conducted at Aquatec Biological Sciences. The results of the following tests are reported:

Client: Menzie-Cura & Associates
Facility/Location: Dead Creek / Sauget, IL
Initial Sampling Date: October 4 - October 9, 1999
Testing Date: October 7 - October 31, 1999

Tests Conducted: Amphipod, Hyalella azteca, 10-day Survival and

Growth

#### **METHODS:**

The procedures followed in conducting these toxicity tests were based on methods described by the USEPA (EPA 600/R-94/024). Test conditions for *Hyalella azteca* are listed in Table 1. Testing was begun in four separate groupings based upon chronological sequencing from the time of sediment collection. The objective for the test groupings was to complete the 10-day acute tests prior to expiration of a 14-day sediment storage time so that subsequent chronic toxicity tests could be started within a 14-day time frame. The first testing group was initiated on October 7, 1999. The second testing group was initiated on October 8, 1999. The third testing group was initiated on October 9, 1999. The fourth testing group was initiated on October 10, 1999. A laboratory control (artificial sediment) was included with each testing group.

Due to unacceptable survival in the both field and laboratory samples, the first three testing groups were combined into two testing groups and were retested, beginning on October 19, 1999 and October 21, 1999, within the project-specific sample holding time. The laboratory control associated with the October 10, 1999 testing group met survival acceptability criteria, therefore acute toxicity testing of samples associated with this testing group was not repeated.

#### **Sediment Preparation**

The samples were stored refrigerated and in the dark whenever they were not being used in preparation for testing. Sediments distributed in test beakers were examined for the presence of indigenous organisms which were removed when observed. Also, large pieces of vegetative material (e.g., leaf litter, sticks, grass) were removed. Qualitative observations regarding the sediment type and indigenous organisms removed were recorded. A laboratory control sediment was used with each Sample Delivery Group. The laboratory control sediment (artificial sediment) was prepared following formulations specified in the USEPA protocols and then hydrated prior to distribution to test chambers. Sediments were then distributed to individual replicate test chambers, overlying water was added, and the overlying water renewal system was activated. The unused portion of each sample (in the original sample container) was returned to refrigerated storage.

#### **Statistical Analysis**

Statistical comparisons were performed against the concurrent laboratory control. The growth measurement was based upon average dry weight of surviving amphipods per replicate, following the USEPA protocol for the test method. This procedure can result in inflated average dry weights for samples with significantly low survival. Statistical significance for any sample was based upon the most sensitive endpoint (survival or growth). An F-Test was performed to test for equality of variances between each sample comparison to the control. If variances were not significantly different, paired T-Tests with equal variances were used to determine whether there were significant reductions in mean survival (Arcsin transformed) and/or mean growth in each sample relative to the control. If the variance between a sample and control comparison was significantly different, paired T-Tests with unequal variances were used to determine significant reductions in mean survival and/or growth.

#### **PROTOCOL DEVIATIONS:**

Surviving amphipods in four test replicates (Samples 12546D, 12550C, 12590D, and 12611B) were not measured for growth (replicate dry weight) due to an apparent laboratory error.

Replicate G of Sample 12590 was scored as having one amphipod surviving on Day 10, however, according to the laboratory documentation, two amphipods from this replicate were weighed for growth determination.

Sample 12547, Replicate H had two surviving amphipods recovered on Day 10. A large dragonfly nymph was also found in this replicate, leading to the possibility that amphipod predation had occurred.

Sample 12609 had an unusual characteristic in the laboratory, in that the sediment expanded within the test beakers. In one replicate (Replicate D), a portion of the sediment separated and floated to the water surface. On Day 10 the measured dissolved oxygen below this separation layer was measured to be 2.0 mg/L

#### **RESULTS:**

Summary result tabulations for the *Hyalella azteca* whole sediment toxicity tests are located in Appendix A.

Group 1 Test Results: This group included samples 12546 (BTOX-C-1), 12547 (BTOX-C-2), 12548 (BTOX-C-3), 12549 (BTOX-D-1), 12550 (BTOX-D-2), 12551 (BTOX-D-3), 12589 (BTOX-B-1), 12590 (BTOX-B-1 duplicate), 12591 (BTOX-B-2), 12592 (BTOX-B-3), 12593 (BTOX-M), 12609 (E-1 Dead Creek), and 12610 (E-2 Dead Creek). Samples 12548, 12589, 12590, 12591, 12592, 12593, and 13609 had survival responses that were significantly less than the Laboratory Control Sample (12552). Samples 12546, 12547, and 12550 had growth responses that were significantly less than the Laboratory Control Sample (12552).

Group 2 Test Results: This group included samples 12611 (E-3 Dead Creek), 12612 (BP-1 Borrow Pit), 12613 (BP-1 Borrow Pit duplicate), and 12614 (BP-3 Borrow Pit), 12638 (BP-2 Borrow Pit), 12639 (F-1 Dead Creek Section F) 12640 (F-2 Dead Creek Section F), 12641 (F-3 Dead Creek Section F). None of the samples in this testing group had survival responses that were significantly less than the Laboratory Control Sample (12622). Samples 12611,

12612. 12613. and 12614 had growth responses that were significantly less than the Laboratory Control Sample (12622).

Group 3 Test Results: This group included samples 12664 (Prairie DuPont Creek), 12665 (Prairie DuPont Creek 2), 12666 (Reference Creek), and 12671 (Ref 2-2 Reference Borrow Pit). The survival and growth responses in all the samples in this testing group were not significantly less than the Labortory Control Sample (12668).

<u>Total Ammonia and Sulfide</u>: Total ammonia concentrations were less than 25 mg/L in all porewaters and less than 7 mg/L in overlying water. Total sulfide was not detected (<0.5 mg/L) in any porewater samples, therefore, testing to sulfide in overlying water was not conducted.

#### **QUALITY ASSURANCE:**

A standard reference toxicant SRT test was conducted concurrently with each batch of Hyalella azteca. The resulting LC50 values fell within control chart limits and were viewed as being acceptable.

Table 1. Test Conditions for the Amphipod (*Hyalella azteca*) 10-day Whole Sediment Survival and Growth Toxicity Test.

ASSOCIATED PROTOCOL: EPA, 1994. Methods for Measuring the Toxicity and Bioaccummulation of Sediment-associated Contaminants with Freshwater Invertebrates Method 100.1 (EPA/600/R-94/024).

1. Test type: Whole-sediment toxicity (static renewal)

2. Test temperature:  $23 \pm 1^{\circ}$ C

3. Light quality: Wide-spectrum fluorescent lights

4. Light illuminance: 500 to 1000 lux

5. Photoperiod: 16 hr. light, 8 hr. dark

6. Test chamber size: 300 mL beaker

7. Sediment volume: 100 mL (distributed to test chambers on the

day prior to administration of test organisms

8. Overlying water volume: 175 mL

9. Renewal of overlying water : At least twice daily

10. Age of test organisms: 7-14 days old at the start of the test

11. Number of organisms /

test chamber: 10

12. Number of replicate test

chambers / treatment:

13. Feeding regime: 1.5 mL YCT daily

14. Aeration: None unless dissoved oxygen in overlying

8

water drops below 40% saturation or demonstrates a declining trend during daily monitoring. If required, aeration will be sufficiently gentle to prevent resuspension

of sediments to the overlying water.

Additional water renewals may be used in

lieu of aeration.

15. Overlying water: Reconstituted water (EPA/600/R-94/024)

Table 2. Test Conditions for the Amphipod (*Hyalella azteca*) 10-Day Whole Sediment Survival and Growth Toxicity Test (continued).

16. Control sediment: Formulated sediment (EPA/600/R-94/024,

section 7.2.3.2)

17. Test chamber cleaning: Overflow screens daily

18. Monitoring:

Overlying water

Temperature

Dissolved oxygen

pН

Conductivity

Alkalinity Hardness

Ammonia

Organism behavior

19. Test duration:

20. End points:

21. Reference toxicant:

22. Test acceptability:

23. Statistical analysis and data interpretation:

Daily Daily

Beginning and end of test Beginning and end of test Beginning and end of test Beginning and end of test Beginning and end of test

Within 2 hours to remove "floaters"

10 days

Survival and growth (dry weight to 0.01 mg,

60°C overnight), by replicate

96-h acute, water only (KCI)

Minimum mean control survival of 80% and

performance-based criteria outlined in

EPA/600/R-94/024, Table 11.3

Arc-sine (square-root) transformation of survival data. F-Tests were performed for equality of variance. Paired T-Tests were performed versus the negative control for

survival and growth.

APPENDIX: A

# Summary of Statistical Tests and Probabilities Dead Creek *Hyalella azteca* Acute Toxicity Test BTR: 3615a

			Sur	vival		Growth						
Day 10	-	Proportion Surviving	F-Test Equal Variance <sup>1</sup>	T-Test Statistical Probability	Statistically Significant	Average Weight(mg)	F-Test Equal Variance <sup>1</sup>	T-Test Statistical Probability	Statistically Significant			
12552	Control	0.86				0 223						
12546	Sample	0.90	0 684	0.241		0.080	0.0856	0.0000	•			
12547	Sample	0 71	0.132	0.066		0.064	0.0264	0.0000	•			
12548	Sample	0.68	0.090	0.008	•	0.110	0.5088	0.0005	•			
12549	Sample	0.90	0 021	0.251		0.172	0.3880	0.0966				
12550	Sample	0.88	0.412	0.382		0.134	0.5643	0.0041	•			
12551	Sampl <b>e</b>	0.90	0.016	0.307		0.168	0.0460	0.0170	•			

<sup>\*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

<sup>1</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

				<del></del>		Day 10	Data		<del></del>	
Sample Number	Replicate	Start Count	# Surviving	Proportion Surviving	Mean Proportion Surviving	Initial Boat Weight (mg)	Total Dry Weight (mg)	# Organisms Weighed	Mean Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)
12552	Α	10	6	0.6		28.52	30.36	6 -	0.307	
ł	В	10	9	0.9		30.76	31.84	9	0.120	
1	С	10	10	1		31.62	33.73	10	0.211	
	D	10	9	0.9		27.67	29.76	9	0.232	
ļ	E	10	8	8.0		29.39	31.17	8	0.223	
Í	F	10	9	0.9		29.56	32.15	9	0.288	
l	G	10	9	0.9		29.61	31.76	9	0.239	
	Н	10	9	0.90	0.86	21.96	23.43	99	0.163	0.223
12546	Α	10	9	0.90		29.35	29.70	9	0.039	
ł	В	10	9	0.90		33.28	34.17	9	0.099	
ł	С	10	9	0.90		31.89	32.49	9	0.067	
i	D	10	9	0.90				•	•	
ľ	E	10	10	1.00		30.55	31.55	10	0.100	
{	F	10	10	1.00		29.54	30.13	10	0.059	
	G	10	7	0.70		31.04	31.90	7	0.123	
	н	10	9	0.90	0.90	36.72	37.41	99	0.077	0.080
12547		10	6	0.60		27.76	27.98	6	0.037	
1234/	A B	10	10	1.00		27.76 30.95	27.98 31.60	10	0.037	
	C	10	7	0.70		30.95 33.31	33.71	7	0.065	
	D	10	8	0.70		33.31 31.58	33.71	8	0.057	
	E	10	7	0.80		31.94	32.53	7	0.079	
	F	10	9	0.70		33.35	34.11	9	0.084	
	Ğ	10	8			25.95	26.62	8	0.084	
	Н	10	2	0.80 0.20	0.71	25.95 33.87	34.29	2	0.084	0.064
12548	Α	10	8	0.80		30.15	30.87	8	0.090	
	В	10	6	0.60		29.31	30.55	6	0.207	
	C	10	6	0.60		31.25	31.55	6	0.050	
	D	10	6	0.60		30.00	30.78	6	0.130	
	E	10	7	0.70		29.78	30.30	7	0.074	
	F	10	6	0.60		31.74	32.32	6	0.097	
	G H	10 10	8 7	0.80 0.70	0.68	30.16 24.43	31.04 25.29	8 7	0.110 0.123	0.110
	<u> </u>			0.70	0.00	24.43	23.25		0.123	0.110
12549	Α	10	10	1.00		31.68	33.23	10	0.155	
1	В	10	8	0.80		26.02	26.64	8	0.078	
	C	10	10	1.00		27.87	29.33	10	0.146	
	D	10	8	0.80		32.54	33.43	8	0.111	
	E	10	8	0.80		28.32	29.87	8	0.194	
	F	10	9	0.90		25.55	26.76	8	0.151	
	G	10	10	1.00		31.47	32.56	3	0.363	0.470
<del></del>	н	10	9	0.90	0.90	28.89	30.50	99	0.179	0.172
12550	Α	10	9	0.90		27.87	28.57	9	0.076	
	В	10	10	1.00		25.64	26.40	9	0.084	
	С	10	9	0.90				•	•	
	D	10	5	0.50		29.10	30.10	5	0.200	
1	F	10	10	1.00		33.58	34.67	10	0.109	
	G	10	9	0.90		23.84	24.96	9	0.124	
	Н	11	11	1.00	0.88	23.93	25.89	11	0.178	0.134
12551	A	10	9	0.90		28.94	30.32	9	0.153	
12331	B	10	10	1.00		26.94 32.79	34.17	10	0.133	
	C	10	8	0.80		34.40	34.17 35.91	8	0.138	
	0	10	10	1.00		27.15	28.98	10	0.183	
	Ē	10	9	0.90		33.25	34.79	9	0.163	
	F	10	9	0.90		33.25 32.88	34.79 34.80	9	0.171	
	F G	10	7	0.90		32.88 27.47	28.58	9 7	0.213	
	H	10	10	1.00	0.90	27.47 25.40	26.56 26.75	10	0.135	0.168
	п	10	10	1.00_	0.90	20.40	20.75	IŬ	0.135	0.100

# Summary of Statistical Tests and Probabilities Dead Creek *Hyalella azteca* Acute Toxicity Test BTR: 3615b

			Sur	vival		Growth					
			F-Test	T-Test			F-Test	T-Test			
Day 10		Proportion Surviving	Equal Variance <sup>1</sup>	Statistical Probability	Statistically Significant	Average Weight (mg)	Equal Variance <sup>1</sup>	Statistical Probability	Statistically Significant		
12552	Control	0.86				0 223					
12589	Sample	0.16	0.184	0.000	•	0.937	0.0000	0.0199			
12590	Sample	0.19	0.044	0.000	•	0.550	0.0000	0.1467			
12591	Sample	0.01	0 530	0.000	•	0.000	NA <sup>2</sup>	NA <sup>2</sup>	•		
12592	Sample	0.64	0.055	0.005	•	0 411	0.0087	0.0122			
12593	Sample	0.10	0.325	0.000	٨	1.372	0.0000	0.0339			
12609	Sample	0.23	0.269	0.000	•	2.136	0.000	0.0029			
12610	Sample	0.76	0.233	0.135		0.664	0.0138	0.0000			

<sup>\*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

<sup>1.</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

<sup>2</sup> There was not enough sample and/or control response variability to conduct a meaningful F-Test.

						Day 10	Data			
Sample Number	Replicate	Start Count	# Surviving	Proportion Surviving	Mean Proportion Surviving	Initial Boat Weight (mg)	Total Dry Weight (mg)	# Organisms Weighed	Mean Wt. within Rep (mg)	
12552	À	10	6	0.60		28 52	30 36	6	0 307	· · · · ·
	B	10	9	0.90		30 76	31 84	9	0 120	
	С	10	10	1.00		31 62	33 73	10	0.211	
	D	10	9	0 90		27 57	29 76	ç	0.232	
	E	10	8	0.80		29.39	31,17	8	0.223	
	F	10	9	0 90		29.56	32.15	9	0.288	
	G	10	9	0.90		29 61	31.76	9	0.239	
	H	10	9	0.90	0.86	21 96	23.43	9	0.163	0 223
12589	A	10	0	0.00					0.000	
	В	10	1	0 10		27 32	28.90	1	1.580	
	С	10	2	0.20		25.27	27.00	1	1.730	
	D	10	0	0.00				Э	0 000	
	Ē	10	1	0.10		27 39	29.27	1	1.880	
	F	10	2	0.20		30 30	33 22	2	1.460	
	G	10	2	0.20		27 29	28.29	2	0 500	
	н	10	5	0.50	0.16	31,69	33.28	4	0.348	0.937
12590	A	10	1	0.10		34 53	36.46	1	1.930	
12000	B	10	Ó	0.00		J4 J3	50.40	0	0.000	
	C	10	5	0.50		33,17	35 83	5	0.532	
	۵	10	6	0 60		00,11		•	1	
	Ē	10	2	0.20		32 63	35 25	2	1.210	
	F	10	0	0.00				0	0 000	
	G	10	1	0 10		35.04	35.40	2	0 180	
	H	10	00	0 00	0.19			0	0.000	0.550
40564	A	10		0.00					0.000	
12591	B	10	0	0.00 0.00				0	0.000 0.000	
	Č	10	0	0.00				0	0 000	
	Ď	10	0	0.00				5	0 000	
	Ē	10	Ö	0.00				5	0.000	
	F	10	Ď	0.00				ō	0.000	
	G	10	1	0.10				٥	0 000	
	H	10	0	0.00	0 01			0	0 000	0.000
12592	A	10	8	0.80		30.25	33 04	6	0 349	
12592	B	10	4	0.60		30.25 32.94	34,30	3	0 453	
	C	10	8	0.80		28,43	30.67	8	0 280	
	Ď	10	8	0 80		33.73	37.12	6	0.424	
	E	10	8	0 80		30.41	32.06	7	0.236	
	F	10	5	0.50		36 67	40.21	5	0.268	
	G	10	3	0.30		25.29	26 69	3	0.467	
	H	10	77	0.70	0.64	33.5	39.21	7	0.616	0.411
10500	<del></del>	10	<del></del>	0.40		26.00	20.00		2.400	
12593	A B	10 10	1 2	0.10 0.20		26 62 31.37	29.00 33.69	1 2	2.180 1.160	
	C	10	0	0.20		31.31	33.08	0	0.000	
	۵	10	0	0.00				5	0.000	
	F	10	1	0.10		22.90	26.11	•	3.210	
	G	10	0	0.00				0	0 000	
	Н	10	1	0.10	0 10	25 36	29 11		3.750	1.372
10055										
12609	A B	10 10	1 1	0 10 <b>0</b> 10		37 16	40 82 37 05	1	3 660 3 440	
	C	10	1	0.10		33 61 36 62	42.83	4	3 440 4 010	
	٥	10	6	0.10		36 62 36 43	40.03	÷	0 635	
	8	10	2	0.20		26 59	29.70	3	1 037	
	F	10	2	0.20		26 53	29.12	2	1 295	
	G	10	4	0 40		32 31	35 65	4	0.835	
	Н	10	1	0,10	0 23	32.77	34 95		2 180	2 136
40010		40	<del></del>	0.00		25.00	20.00		0.000	
12610	A B	10 10	6 8	0 60 0.80		25 00 29 95	28.98 35.42	ê ê	0 663 0 684	
	C	10	8	0.80		29 95 26 78	35.42 32.93	6 5	0 769	
				1 00		32 53	36 55	10 10	0 402	
	Ď	10	าก						U U4	
	D	10 10	10 10							
	₽ D	10	10	1.00		30 09	34 73	• ၁	0 464	
	D									

# Summary of Statistical Tests and Probabilities Dead Creek *Hyalella azteca* Acute Toxicity Test BTR: 3633a

Survival

F-Test T-Test

Proportion Equal Statistical Statistically Average Equal Statistical Statistically

Surviving Variance Probability Significant

Weight (mg) Variance Probability Significant

Day 10		Surviving	Variance <sup>1</sup>	Probability_	Significant	Weight (mg)	Varianco¹	Probability	Significant
12622	Control	0.86				0.202			
12611	Sample	0.85	0.653	0.402		0.141	0 620	0.001	•
12612	Sample	0.89	0.105	0.376		0.156	0 701	0.007	•
12613	Sample	0 94	0.043	0.462		0.154	0.894	0.009	•
12614	Sample	0.91	0.037	0.436		0.154	0.851	0.006	•

<sup>\*</sup> A statistically significant reduction in the response was observed (relative to the Faboratory Control, P<0.05).

<sup>1.</sup> If the F-Test result was significant (relative to the Laboratory Control, P+0.05), the T-Test was performed using unequal variances

	·····				-	Day 10	Data			
Sample Number	Replicate	Start Count	# Surviving	Proportion Surviving	Mean Proportion Surviving	Initial Boat Weight (mg)	Total Dry Weight (mg)	# Organisms Weighed	Mean Wt. within Rep (mg)	Mean Wt Reps I-L (mg)
12622	Α	10	7	0.70		35.9	37.45	7	0.221	
	В	10	10	1.00		33.92	35.55	10	0.163	
	С	10	8	0.80		33.32	34.81	8	0.186	
	D	10	9	0.90		35.54	37.78	9	0.249	
	Ē	10	10	1.00	•	36.47	38.59	10	0.212	
	F	10	10	1.00		32.63	34.74	10	0.211	
	Ġ	10	8	0.80		34.83	35.85	7	0.146	
	н	10	77	0.70	0.86	38.00	39.57	7	0.224	0.202
10011	···			0.00		64.00	05.50		0.450	
12611	A B	10 10	6 8	0.60 0.80		34.69	35.59	6	0.150	
		10	9			25.62	20.05	9	0.440	
	C	-		0.90		35.63	36.65		0.113	
	D	10	8	0.80		39.05	40.29	8	0.155	
	E	10	9	0.90		33.19	34.90	9	0.190	
	F	10	10	1.00		36.59	37.69	10	0.110	
	G	10	9	0.90		39.11	40.26	9	0.128	0.4.4
	<u> </u>	10	9	0.90	0.85	35.08	36.37	9	0.143	0.141
12612		10	8	0,80	<del></del>	38.55	39.66	8	0.139	
12012	B	10	9	0.90		35.51	36.77	9	0.135	
	C	10	10	1.00		35.22	36.80	10	0.158	
	D	10	8	0.80		35.08	36.51	8	0.179	
	E	10	9	0.90		34.78	35.87	9	0.173	
	F	. 10	9	0.90		34.36	35.98	9	0.121	
	Ġ	10	9	0.90		41.04	42.20	9	0.129	
	Н	10	9	0.90	0.89	45.19	47.04	9	0.206	0.156
12613	Α	10	10	1.00		40.36	41.89	10	0.153	
	В	10	9	0.90		39.26	40.33	9	0.119	
	С	10	10	1.00		33.68	34.99	10	0.131	
	D	10	8	0.80		41.33	42.35	8	0.128	
	Ε	10	10	1.00		41.45	42.84	10	0.139	
	F	10	10	1.00		40.34	41.91	10	0.157	
	G	10	9	0.90		42.22	44.29	9	0.230	
	н	10	9	0.90	0.94	40.51	42.12	9	0.179	0.154
12614		10	10	1.00		38.64	39.76	10	0.112	
	В	10	9	0.90		38.95	40.19	9	0.138	
	Č	10	7	0.70		37.28	38.23	7	0.136	
	Ď	10	10	1.00		35.81	37,18	10	0.137	
	Ē	10	10	1.00		37.76	39.92	10	0.216	
	F	10	10	1.00		41.40	42.92	10	0.152	
	G	10	7	0.70		41.23	42,46	7	0.176	
	н	10	10	1.00	0.91	40.04	41.68	10	0.164	0.154

<sup>\*</sup>No organisms weighed, see Protocol Deviations.

# Summary of Statistical Tests and Probabilities Dead Creek *Hyalella azteca* Acute Toxicity Test BTR: 3633b

	-	•	Sur	vival		Growth					
Day 10		Proportion Surviving	F-Test Equal Variance <sup>1</sup>	T-Test Statistical Probability	Statistically Significant	Average Weight (mg)	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant		
12622	Control	0.86				0.202					
12638	Sample	0.96	0.054	0.036		0.172	0.434	0.085			
12639	Sample	0.91	0.349	0.216		0 221	0.885	0.140			
12640	Sample	0.86	0.051	0 233		0.219	0.741	0.144			
12641	Sample	0 83	0 043	0 154		0 183	0.213	0 217			

<sup>\*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, p<0.05).

<sup>1</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the 1-Test was performed using unequal variances.

				-		Day 10	Data			
Sample Number	Replicate	Start Count	# Surviving	Proportion Surviving	Mean Proportion Surviving	Initial Boat Weight (mg)	Total Dry Weight (mg)	# Organisms Weighed	Mean Wt. within Rep (mg)	Mean W Reps I-L (mg)
12622	A	10	7	0.70		35.9	37.45	7	0.221	1
	В	10	10	1.00		33.92	35.55	10	0.163	
	C	10	8	0.80		33.32	34.81	8	0.186	
	Ď	10	9	0.90		35.54	37.78	9	0.249	
	Ē	10	10	1.00		36.47	38.59	10	0.212	
	Ē	10	10	1.00		32.63	34.74	10	0.211	
	Ġ	10	8	0.80		34.83	35.85	7	0.146	
	Н	10	7	0.70	0.86	38.00	39.57	7	0.224	0.202
				0.70	0.86	36.00	39.31		0.224	0.202
12638	A	10	10	1.00	<del></del> -	36.21	37.61	10	0.140	
	В	10	10	1.00		32.14	33.57	10	0.143	
	С	10	9	0.90		37.76	38.77	9	0.112	
	D	10	10	1.00		40.64	42.43	10	0.179	
	E	10	9	0.90		35.52	36.71	9	0.132	
	F	10	10	1.00		31.14	33.25	10	0.211	
	G	10	10	1.00		35.66	38.00	10	0.234	
	<u>H</u>	10	9	0.90	0.96	37.52	39.54	9	0.224	0.172
12639	Α	10	9	0.90		34.44	35.79	9	0.150	
	В	10	10	1.00		36.84	38.81	10	0.197	
	С	10	8	0.80		34.06	36.20	8	0.268	
	D	10	9	0.90		27.24	29.41	9	0.241	
	Ε	10	10	1.00		28.68	31.15	10	0.247	
	F	10	8	0.80		34.61	36.40	8	0.224	
	G	10	9	0.90		37.94	40.05	9	0.234	
	Н	10	10	1.00	0.91	37.24	39.34	10	0.210	0.221
12640	A	10	8	0.80		27.90	29.53	8	0.204	
12040	B	10	6	0.60		27.90	25.14	6	0.290	
	Č	10	9	0.90		37.66	39.44	9	0.198	
	D	10	8	0.80		25.06	26.72	8	0.198	
	E	10	10	1.00		25.06 28.45	26.72 30.63	10	0.208	
	F	10	9	0.90		28.45 31.90	30.63 33.71	9	0.218	
			_					9 10		
	G	10	10	1.00	0.00	34.54	36.64		0.210	0.219
<del></del>	Н	10	9	0.90	0.86	33.49	35.53	99	0.227	0.219
12641	A	10	8	0.80	<del></del>	30.74	31.70	8	0.120	
	В	10	10	1.00	•	30.83	32.75	10	0.192	
	Ċ	10	9	0.90		31.24	32.49	9	0.139	
	D	12	12	1,00		33.61	35.62	12	0.168	
	Ē	10	9	0.90		34.36	36.17	9	0.201	
	Ē	10	7	0.70		26.92	28.19	7	0.181	
	Ġ	10	4	0.40		36.63	37.85	4	0.305	
	H	10	9	0.90	0.83	39.97	41.38	9	0.157	0.183

## Summary of Statistical Tests and Probabilities Dead Creek *Hyalella azteca* Acute Toxicity Test

BTR: 3461

			Sui	vival		Growth						
Day 10		Proportion Surviving	F-Tost Equal Variance	T-Test Statistical Probability	Statistically Significant	Average Weight (mg)	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant			
						0.202						
12668	Control	0 98				0.268						
12664	Sample	0.98	1.000	0.500		0.254	0 547	0.261				
12665	Sample	0.98	1.000	0.500		0.404	0.601	0.000				
12666	Sample	0.98	1.000	0.500		0.393	0.034	0.002				
12671	Sample	0.98	0.367	0.478		0 335	0.511	0.003				
12671	Sample	0.98	0.367	0.470		0.333	., 311	0.003				

<sup>\*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Cor $^{-1}$   $\approx$  0.05).

						Day 10	Data	<u> </u>		
Sample Number	Replicate	Start Count	# Surviving	Proportion Surviving	Mean Proportion Surviving	Initial Boat Weight (mg)	Total Dry. Weight (mg)		Mean Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)
12668	Α	10	10	1.00		30.81	33.19	10	0.238	
Ī	В	10	10	1.00		26.79	29.62	10	0.283	
l	С	10	10	1.00		29.98	32.17	10	0.219	
	D	10	10	1.00		23.66	26.88	10	0.322	
	E	10	9	0.90		26.13	28.6	9	0.274	
	F	10	10	1.00		29.22	32.29	10	0.307	
	G	10	9	0.90		21.52	23.68	9	0.240	
	H	10	10	1.00	0.98	24.02	26.59	10	0.257	0.268
				1.00	0.00	24.02			0.201	
12664	A	10	10	1.00		39.18	40.98	10	0.180	
	В	10	10	1.00		32.99	35.06	10	0.207	
	С	10	9	0.90		41.23	43.62	9	0.266	
	D	10	10	1.00		36.75	39.51	10	0.276	
	E	10	10	1.00		32.17	35.43	10	0.326	
	F	10	9	0.90		40.12	42.65	9	0.281	
	G	10	10	1.00		36.04	38.49	10	0.245	
	н	10	10	1.00	0.98	35.76	38.29	10	0.253	0.254
12665	Α	10	9	0.90		27.97	31.79	9	0.424	
	В	10	10	1.00		29.88	33.46	10	0.358	
	С	10	10	1.00		29.18	32.64	10	0.346	
	D	10	10	1.00		28.55	32.54	10	0.399	
	E	10	10	1.00		29.28	33.98	10	0.470	
	F	10	9	0.90		28.25	32.36	9	0.457	
	G	10	10	1.00		31.97	35.91	10	0.394	
	H	10	10	1.00	0.98	24.38	28.25	10	0.387	0.404
12666	A	10	9	0.90		34,15	37.52	9	0.374	
	В	10	10	1.00		34.11	38.09	10	0.398	
	C	10	10	1.00		35.53	39.32	10	0.379	
	D	10	10	1.00		37.52	41.57	10	0.405	
	E	10	10	1.00		29.66	33.32	10	0.366	
	F	10	10	1.00		32.52	36.79	10	0.427	
	G	10	9	0.90		32.96	37.95	9	0.554	
	<u> </u>	. 10	10	1.00	0.98	31.85	34.27	10	0.242	0.393
10674		10	10	1.00		25.12	27.91	10	0.279	
12671	A			1.00				10 6		
	В	10	8	0.80		30.63	33.41		0.348	
	C	10	10	1.00		30.06	32.94	10	0.288	
	D	10	10	1.00		33.29	36.48	10	0.319	
	E	10	10	1.00		29.46	32.75	10	0.329	
	F	10	10	1.00		29.84	33.01	10	0.317	
	G	10	10	1.00		32.94	36.73	10	0.379	
	Н	10	10	1.00	0.98	32.14	36.32	10	0.418	0.335

	<b>E</b>		
Page	E	1	

## Aquatec Biological Sciences Chain-of-Custody Record

75 Green Mountain Drive South Burlington, VT 05403 TEL; (802) 860-1638 FAX: (802) 658-3189

COMPANY INFORMATION		COMPANY'S PROJECT INFORMATION			ΙΛΤΙΟΝ	SHIPPING INFORMATION			1E/CON PRESEF	_		
Name: Menzie Cura & Associates	F	roject Nam	e: <u>Deac</u>	l Creek Sedim	ent Tox	Carrier:	4ºC					
Address: One Courthouse Lane, Suite 2				000						_	_	
Chelmsford, MA 01824	1	roject Num				Airbill Number:	plastic	ĺ			Ì	Ì
Telephone: (978) 453-4300	5	iampler Nai	ne(s):	<del></del>			l l					
Facsimile: (978) 453-7260						Date Shipped:					_	_
Contact Name: Ken Cerrelo, Ph.D.						·	1 gal					
	i	Quote #:	3/99	Client Code:	MENCUR	Hand Delivered:YesNo						·
SAMPLE IDENTIFICATION	COLI.	ECTION TIME	GRAB	COMPOSITE	MATRIX	ANALYSIS / REMARKS		AILIMI	ER OF	CONTA	NEDC	
JAWA EE IDEIVIII (DAVIOI)	. /	<del>                                      </del>	0117115		Sediment	Hyalella azleca 10-d Survival & Growth		NOMB	EROF	CONTAI	NERS	
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					Sediment	Hyalella azteca 10-d Survival & Growth Hyalella azteca 42-day Chronic Toxicity Chironomus tentans 10-d Survival & Growth Chironomus tentans Chronic Toxicity						
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i-4	DATE	TIME	Receiv	ed by: (signali	ire)							
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## Aquatec Biological Sciences



75 Green Mountain Drive South Burlington, VT 05403 TEL: (002) 000-1038

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COMPANY INFORMATION		COMPA	NY'S PRO	OU CT INFORM	MATION	SHIPPING INFORMATION		VOLUN	ME/GON PRESEI			
Name Menzie Cura & Associates		Project Nan	mo <u>Dea</u>	nd Crook Sedim	nent Tox	Corrier	49C		1		1	
Address One Courthouse Lane, Suite 2	2			•			7				<b>1</b> '	( <i> </i>
Chelmsford, MA 01824		Project Nun	mber: <u>0</u> £	9033		Airbill Number	A	-	-		-	
Telephone (978) 453-4300		Sampler Na	ame(s)				plastic	1			'	
Lacsimile (978) 453-7260	Ī					Date Shipped					- !	
Contact Name - Ken Cerrelo, Ph D	]				,		t gat		1	'	[ '	
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## Aquatec Biological Sciences Chain-of-Custody Record

75 Green Mountain Drive 14 South Burlington, VT 05403 17 TEL: (802) 860-1638 17 FAX: (802) 658-3189

COMPANY INFORMATION		COMPAN	Y'S PRO.	JECT INFORM	MOLLVI	SHIPPING INFORMATION	PRESERVATIVE					
Name: Menzie Cura & Associales	_	roject Nan	ne: <u>Deac</u>	l Creek Sedim	ent Tox	Carrier:	·49C					
Address: One Courthouse Lane, Suite	2											
Chelmsford, MA 01824	ļ F	Project Nun	ber: <u>99</u>	033		Airbill Number:	plastic					
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Facsimile: (978) 453-7260						Date Shipped:						
Contact Name: Ken Cerreto, Ph.D.	-						1 gal					
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SAMPLE IDENTIFICATION	COLL	ECTION	GRAB	COMPOSITE	MATRIX	ANALYSIS / REMARKS		ALL JAAD	EB OF (	CONTAI	NEDC	·
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Relinquished By: (Signature) Date Time				Received By: (Sig	nature)		Date	Time	Note () H.azteca/ C. Lentans acute/ Ononic sediment/ -10 Kicity teals	
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APPENDIX: C

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3615
	Test Start: October 19, 1999	Test End: October 29, 1999

					Repick	Total	#	Init Pan	Total	1
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	E	(0			_	10	10	30.55	3i.55	1 ''`
	F	0	76	-		19	10	29.54	30.13	1
	G	7		0	m 1/4	7	7	31.04	31.90	1
	Н	9			_	9	9	36.72	37.41	1
									<del></del>	
12547	Α	6	9	0	7m ::!"	(o	6	27.76	27.98	]
	В	10	T			10	10	30,95	31.60	1
	С	7	TYN	0	DMil.	7	7	33,31	33.71	
	D	8	m	0	m 11/4	8	7 8	31.58	32.21	1
	E	6	0_		Milling	7	7	31,94	32.53	
	F	9	J			9	9	33,35	34 11	
	G	<u>R</u>	Ris	0	7777	8	Ŗ	2595	26.62	1
	H	3	JK		<u>-</u>	0	<b>D</b>	33,87	34.29	
										1
12548	<u>A</u>	8	RB		all TM	3	Ç	30.15	30.87	
	В	3	10	- 3	TM	<u>(e</u>	6	29.31	30.55	
ł	<u>_C</u>	6	TiG-		19.4	6	6	31,25	31.55	ļ
	D	5	10		174 mg.	<u></u>	6	30.00	30.78	4
135	E	7	TM	نے	76 119	<u>+</u>	7	29,78	30.30	]
المنطقة الم	<u>-</u>	_6,	Tm	O	JW W	16	6	31.74	32.32	1
rus	<u>G</u>	_8	06			18	8	30.16	31.04	
7 200 -	• н	7	TM			<u> </u>	7	24,43	25.29	]
							<del></del>	0 : (=		7
12549	A	10	<u> </u>			_{9_	10	31.68	33.23	1
	В	- 3	<u> </u>			<u> </u>	<u> </u>	26.08	26.64	j
	<u>C</u>	io	<u> </u>			( 0	10	27.87	29.33	<b>↓</b>
ļ	D	× ×	TM	0	16-11/7	<u>&amp;</u> _	9	32.54	33.43	<u> </u>
	E	8	76			3	×	2832	29.87	1
	F		111	(I)	Mida	9	× ×	25.55	26.76	1
	G	'υ	36			10	× × × × × × × × × × × × × × × × × × ×	31.47	32.56	1
L	Н	9	J	0	Thain	9	9	28.89	30.5°	Ĺ

Balance QC Initial (20 mg = 19,47) Final (20 mg = 19.97) Balance Asset #:	
Date/time In 1/14 - "Temp("C) 79" Init JG Date/time out 11/5 16 = Temp("C) 79"C	Init. 7h
Comments 1) One inspectly runnyk (Dianata) procest, 10/29 JG	
Reviewer Of Original Sciences South Burkington, Vermont	4.06.12

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3615
	Test Start: October 19, 1999	Test End: October 29, 1999

Sample	Repl.	# Alive	10/29/99 Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12550	Α	9	m			9	9	27,87	28.57	
	В	10	J	(		10	9 00E	25.64	26.40	
k	С	9	Tm	_		9	0 5	27.50		
chionomids pregnat	D	5	Tm	0	JG11/7	5	5	29.10	30.10	
Chroan	E	8	JG			8	8	28,55	29.86	
pres	F	10	JG	_		10	10	33,58	34.67	
	G	9	J			9	G	23,84	24.96	i
	Н	7/	T		_	11	(1		25.89	
			·				· · · · · · · · · · · · · · · · · · ·			
12551	Α	9	16			9	9	28.94	30.32	
	В	10	1			10	10	32.79	34.17	
	С	8	7M	0	JG11/7	8	8	34.40	35.91	
	D	10	75			10	10	27.15	28.98	
	E	9	7	_	_	9	9		34.79	
	F	9	36			Q	9	32.88	34.80	
	G	4	16	~_	_	7	7	27.47	28.58	
	Н	10	36		_	10	10	25.40	26.75	
										•
12552	Α	6	J	0	15 11/7	6	6	28.52		
	В	9	16			9	9	30,76	31.84	
	С	10	J			10	10	31.62	-33.73	
	D	9	5			9	9	27.67	29.76	
	$\bot$								~	
	E	6		0	JG11/12	_8	8	29,39	31.17	
	$\bot$	9	7m	0	JG11/12	8	9	·		
	E F G	9	7m 136	0	JG11/12 	9		29,39 29,56	31.17	
	E F	9		0	16 11/12 		9	29,39 29,56 29,61	31.17 32.15	ant at
	F G H	9		<u> </u>	JG 11/12	9	9	29,39 29,56 29,61	31.17 32.15 31.76	ग्गी <i>व</i> [वव
12589	E F G H	9		0 -	JG 11/12	9	9	29,39 29,56 29,61 21,96	31.17 32.15 31.76 23.43	Brokedo
12589	E F G H	9			JG 11/12	9	9	29,39 29,56 29,61 21,96 25,38 27,32	31.17 32.15 31.76 23.43	Broke do Repa I
12589	E F G H	999				9 9 0 2	9	29,39 29,56 29,61 21,96	31.17 32.15 31.76 23.43	Broke do Rept I from char
12589	E F G H	9 9	16 5 30	) ) ) ) ) ) )		9	9	29.39 29.66 29.61 21.96 25.38 27.32 25.27 27.66	31.17 32.15 31.76 23.43 28.90 27.00	Broke do Rept I from char I = 3 Su
12589	E F G H A B C D E	999	16 5 30	) ) ) ) ) ) )		9 9 0 2	9	29,39 29,56 29,61 21,96 25,38 27,32 25,27 27,66 27,39	31.17 32.15 31.76 23.43 	Broke do Rept I from char
12589	E F G H A B C D E F	999	70000000000000000000000000000000000000	))),	- 1611/7 1611/9 1611/4	9 9 0 2	9 9 9	29.39 29.66 29.61 21.96 25.38 27.32 25.27 27.66 27.39 30.30	31.17 32.15 31.76 23.43 	Broke do Rept I from char I = 3 Su 11/9/99
12589	E F G H A B C D E F	-27-Chi-0	JOHN COMPURE		1611/7 1611/9 1611/4 1611/4	9 9 0 20 1	9 9 9	29.39 29.56 29.61 21.96 27.32 25.27 27.66 27.39 30.30 27.29	31.17 32.15 31.76 23.43 	Broke do Rept I from char I = 3 Su
12589	E F G H A B C D E F	999	70000000000000000000000000000000000000	))),	- 1611/7 1611/9 1611/4	9 9 0 7 0 1 2	9 9 9	29.39 29.66 29.61 21.96 25.38 27.32 25.27 27.66 27.39 30.30	31.17 32.15 31.76 23.43 28.90 27.00 29.27 33.22	Broke do Rept I from char I = 3 Su 11/9/99

Balance QC: Initial (20 mg = 19.94 ) Final (20 mg = 19.94 ) Balance Asset #:

Date/time In 11/19/75 Temp(°C) 80° Init. KRD Date/time out 11/20 17:00 Temp(°C) 83— Init. JG

Comments:

Reviewer: Date: 12/3/99 hasurvwt.doc

000020

Client:	Menzie	-Cura &	Assoc.	Project:	99033 Dea	d Creek	BTR	: 3615		
					t: Octobe			End: Oc	tober 29,	1999
					Daniele	Total	#	Init Pan	Total	1
Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Wt.	Total Dry Wt.	
12590	Α	1		0	m IIII		1	34.53	36.46	]
بالمكماء	B¥	0	RB	: 0	136 11/7	0		34.632		]
سرعكميه	С	5	TM	0	m III	5	5	33. 17	35.83	
San Comment	D	(0	15	$\overline{O}$	1611/2	00		37.06		i
cyc	E	1	RB	)	7m 11/11	20	يني	32,83	35,25	1
	F	0	36			Ò		40,18		1
	G	<del>- }</del>	15	0	in 11/11	1	2		35,40	1
	Н	$\overline{\Delta}$		Č	15119	0		26.30		İ
				<del></del>	90 11			<u> </u>		
2591	Α	$\circ$	16			8		21.31		Broke
	В	()	-	On	mile	0		23.43		Reps 1
10 5 19 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	C	8	X			0		22 43		found
4 4 mm	D	0				O		22.19		Surviv
182 T	E	0	10			$\delta$		19.98		H.OZH Termi
	F	$\tilde{\alpha}$				$\overline{\wedge}$		19.34		Chron
ended Chal	<del>'</del> G	<u> </u>	36			<u> </u>		20.45		+29+
	<del>-</del>					O				11/4
						<u> </u>		23.32		1
12592	Α	3	1	0	3611/7	8	8	30.25	33,04	[
	В	-й	70			4	\3	32 94	34,30	1
	C	8	7		3611/9	8		28. +3	30.67	1
	D	8		<del></del>	JE 11/7	8/	\$	33.73	37.12	1
	E	3	10			3	7	30.41	32.06	i
	F	<u> </u>		<del></del>			2	38.87	40,21	ł
	G	<del>-9</del>	50			3	<del></del>			ł
	H	<del>- 그</del>	TIM		16.116	<del>\</del>	<del></del>		26.69	ł
	<u> </u>		111/	<u> </u>	J6 11/9	<u> </u>	<u>+</u>	33,50	29.21	J
12593	Α		16	/ _		1	1	26.82	29.00	Jan Jan
بويع ر	В	2	70			2	7-	31.37	33,69	, ν
N's 30 11 5	C	5	1					27.48	20.01	103 1
کس <sub>ک</sub> استور	<u>D</u>	-	10		<del></del>			21.40		gonu ,
~	E,	3	7		<del></del>	$\frac{\mathcal{S}}{\mathcal{S}}$	=	26.11	31.17	gour, a
1	F 1343		10	<del>-</del>	<del></del>	<del>-7</del>	1-5-		3617	82,10
	G Vicia		70	<del></del>			<del>                                     </del>	<u>22.90</u>	26.11	ord and
		<u>`                                    </u>	75			<u> </u>	<del>                                     </del>	26.46	2011	**
	Н			Combine	ly sixed			25.36	27.1	]
laiacco (	DC 100	iai (20 mg =	RD 19.94	Emal	(20 mg = /9	95	Balance A	SSE1 #-		
Balance (		71 Temp(°C		Int KRD	Date/time		Temp		Init.	

hasurant boo Laboratory: Aquatec Siological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3615
1	Test Start: October 19, 1999	Test End: October 29, 1999

Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12609	Α	1		0	1 HI4	1	1	37.16	40.82	
*	В	1	RB	0	46117	<u>r</u>	1	33, 61	37.05	
	С	Ũ.	76	~	TM 1114	1 /	1	38.82	42.83	
*	D	2630	- 16		, — \	18.96	10	36, 43	40,24	
	ш	2	15	0	3611/7	12	3	24.59	29,70	
	F	2		0	m 11/14	<u>~</u>	2	24.53	29,12	
	G	4	14	0	JG 11/7	<del></del>	<del>                                     </del>	32.31	35,645	(G
	Н		16					32.77	34.95	
12610	Α	6	3(5			6	6	25.00		
ļ	В	8	RB_			<u>Z</u>	8	29.95	35,42	
	С	8	R.B			8	8	26.78	32,93	
	D	10	<u> </u>			10	10	32.53	36,55	
	E F	10	RB-			_10	10	30.09	34,73	
j	G	8	<u> </u>	0	m 11/4	7 8	7	25,59	29.73	
	Н	3		0	JG 11/8	4	<i>II</i>	34.39	31,83	
					90 118			U 1.51	001 51	
	Α									
ļ	В									
	<u>c</u>		·				ļ	<del> </del>		
	D E									
ł	F							<del> </del>		
	G					<del></del>		<del> </del>	<b></b>	
1	$\frac{H}{H}$									
							<u></u>	·	<del></del>	
	A B			<del></del>		<del></del>	<u> </u>	<del> </del>		
	С		<del></del>			<del></del>	<b> </b>	<del> </del>	<del> </del>	
i	D					<del>-</del> ,	<del>                                     </del>	<del> </del>	<del>  </del>	
į	E		·		<del></del>		<del>                                     </del>	<del> </del>		
	F					<del></del>			0000	2
	G									
	Н									
			KRD							

Balance QC:	Initial (20 mg =	19.95	) Final (2	20  mg = 19.95	)	Balance Asset #:		
Date/time In i	روام، Temp(°C)	500	Init. KRD	Date/time out		Temp(°C)	Init.	
Comments:	17:35							

# 12609 - Sample DO's very low, 609D has very little
something water. Sediment
expanded during teating. 10/29
Points of somen flooring.
Fileners us algae

Menzie Cura Dead Creek 99033 BTR s 3615, 3622, 3629 Aquatec Biological Sciences

	Initial Dry Weight Data										
Replicate	# Weighed	Initial Boat Weight (mg)	Final Dry Weight (mg)	Mean Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)						
1	10	39.02	40.45	0.143							
2	10	40.11	41.6	0.149							
3	10	38.73	40.19	0.146							
4	10	41.98	43.41	0.143							
5	10	41.09	42.75	0.166							
6	10	35.32	36.81	0.149							
7	10	40.47	41.86	0.139							
8	10	35.92	37.64	0.172	0.151						

## Hyalella azteca Initial Dry Wt. ( Pre-TesT)

Client: Menzie-Cura &	Project: 99033	BTR: 3615/ 3629 / 3 622
Assoc.		October 19 1999
Culture ID: 10/19	Age: q day	'S

<b>5</b>	Number of	Initial Pan Weight	Final Pan Weight
Replicate	Organisms weighed	(mg)	(mg)
1	10	39.017	40.45
2	10	40.110	41.60
3	10	38.733	40.18
4	10	3°44. 982 41.978	43,41
5	10	41.086	42.75
6	10	35, 324	36.81
7	10	40.468	41,86
8	10	35. 917	37.64
Initials:			
Date:			

_	AUG UT
1	WT. (Mg)
	0.143
	0.149
	0.146
	0.143
	0.166
	6.149
	0.139
	0.172
1	

Balance QC: Initial (20 mg = <i>/9,96</i> ) Asset #:	Final (20 mg = /9.96 ) Balance
Date/time Inでするから Temp(°C) 多つっし Init. Temp(°C) SO Init.コG	S Date/time out 12/5 12:00
Comments:	

Subset of Emphipolis used for acuse test sizers on 10/19/99

Reviewer: Date: 12/8/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont



## Aquatic Research Organisms

### DATA SHEET

I.	Organism I	listory
	Species:	Hyglella azTeca
	Source:	Lab reared Field collected
		Hatch date 10/9-10/99 Receipt date
		Lot number 1009 \$9 Hg Strain ACO
		Brood OriginationUS FWS MO
Ш.	Water Qua	lity
		Temperature 24 °C Salinity ppt DO 7.6
		pH 7 / Hardness 2/80 ppm
III.	Culture Co	nditions
		System: Pin STUTIC / CNKW9/
	ł a c	Diet: Flake Food Phytoplankton Trout Chow
^ . C .	= = 1999	Diet: Flake Food Phytoplankton Trout Chow  Brine Shrimp Rotifers Other  Prophylactic Treatments:
1-4	1710	Prophylactic Treatments:
	jud	Comments:
31.5	3/4/99	Comments:
γ. του.	Shipping In	of ormation
SRT on	10/23/49	Client: AUARCH # of Organisms: 2500
	•	Carrier: 1-42 & Date Shipped: 10/18/99
Bio	logist:	Ster Sintific

Ct. Menzie	-Cura & Associates	,   1 10 <u>)</u>		33 Dead	- OTCCK	Dav	of Ana		10 1650	Starts 10	113133		
Comple	Parameter	0										1 40	
Sample	Parameter	U				•		ĺ	_		9	10	
12546	T (°C) + <del>∕</del> ⁄	23.1	27.5	22,5	32.9 22.7	21.9	33.31	31.7	20.4	22.6	21.7	22	
	рН	7.8	Х	Х	Х	X	7.7	X	X	Х	Х	7.0	
	DO (mg/L)	7.2	6.4	6.8	6.0	7.2	7-0	7.3	6,8	65	6.2	6.	
	Conductivity	450	Х	X	Х	X	290	X	Х	Х	Х	310	
	Ammonia, alk/hardness	>	Х	X	Х	X	X	X	Х	Х	Х	V	
12547	T (°C)	<b>33.</b> 2	22.2	22,2	23.2		7. AT					22-	
	pН	7.6	Х	X	X	Х	76	Х	X	X	X	7.	
	DO (mg/L)	6.5	5.3	6,4	5.6	6,3	6.4	5.8	5.4	55	5.1	5.	
	Conductivity	430	Х	X'	Х	Х	300	Χ.	Х	Х	Х	315	
	Ammonia, alk/hardness		Х	Х	Х	Х	Х	Х	Х	Х	Х	1	
12548	T (°C)	23.4	ح.22	22,3								21.9	
	pH	7.7	Х	Х	Х	Х	7-6	Х	Х	Х	Х	7.	
	DO (mg/L)	6.2	5.7	6,0	5.2	6.7	7-0	7.0	5.8	5.9	5.2	5.	
	Conductivity	460	X	X	Х	X	280	Х	X	X	X	310	
	Ammonia, alk/hardness	1	Х	Х	Х	Х	X	Х	Х	Х	X	/	
	Init./Date (1999):	10/19 TM	10/20	10/21	19/22	10/23	10/24 m	10/25	10/26	10/27 //M	10/28	19/2	
₩· nents:	Temperare me	doute	Vin	reflec		neacu	veren	- fro	70(2)	neo .	Aprile		

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

		BTR: 3615 Test Starts 10/19/99  Day of Analysis										
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	10
12549	T (°C)	23.2	22./	32.4								21.
	pН	7.8	X	X	Х	X	7.7	Х	X	X	X	7.(
	DO (mg/L)	68	6.3	6.8	6.5	7.3	7.1	7.8	6,3	5.9	6.5	6
	Conductivity	390	x	X	X	X	20	X	X	Х	X	30
	Ammonia, alk/hardness		Х	X	X	×	X	X	X	X	X	36
12550	T (°C)	24.3	a.2.0	22.4	_							<u>21.</u> °
	рН	7.9	X	X	Х	Х	7.7	X	X	X	Х	7.
	DO (mg/L)	7.3	4	6.5	6.7	7.3	73	7.7	6.3	5.7	6.2	5.
	Conductivity	380	X,	X	X	X	280	X	X	X	X	30
	Ammonia, alk/hardness	/	×	X	X	X	×	X	×	Х	X	レ
12551	T ("C)	22.7	227	22.4								21.
	pН	7.9	X	X	X	X	7.7	X	×	X	X	71
	DO (mg/L)	6.4	18	6,8	6.3	73	7.2	7.2	5,9	5,8	6.1	5 (
	Conductivity	380	<b>`</b> x	X	X	1	270	X	X	X	X	30
	Ammonia, alk/hardness		X	X	×	X	X	X	X	X	X	レ
	Init./Date (1999):	19/19	10/20	10/20	19/23	10/22	19/24	19/35	10/26	10/27	19/28	19/2

Comments:

Date: 12/3/99

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1 - boratory: Aquatec Biological Sciences, South Burlington, Vermont

ct: Menzie												
		Day of Analysis										
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	1
12552	T (°C)	22.0	22.7	22.5								21:
	рН	7.6	X	Х	Х	Х	7-8	Х	Х	Х	Х	7.8
	DO (mg/L)	8.7	7.9	74	7.7	7.5	7.5	7.9	7.1	6.7	7.0	7.0
	Conductivity	420	Х	Х	Х	Х	310	Х	X	X	Х	30
	Ammonia, alk/hardness	/	Х	X	Х	Х	Х	Х	Х	X	Х	V
12589	T (°C)	22.9	-, 2,9	22.5	13:2	22:37.4	235	22.7	22.2 22.4 X	22.60	22.5	22
	рН	7.8	Х	Х	X	X	7.7	X	X	X	X	7
	DO (mg/L)	7:00	6-6	6.4	6.2	7.3	7.0	7.4	6,6	6.3	6.3	6-
	Conductivity	400	Х	Х	Х	Х	290	Х	Х	X	Х	31
	Ammonia, alk/hardness	~	Х	Х	Х	Х	Х	Х	Х	Х	Х	L
12590	T (°C)	21-9	37/	22.8								22
	рН	7.8	Х	Х	Х	Х	7-7	Х	Х	X	X	7.
	DO (mg/L)	6.5	68	6.4	7.0	7.3	7-0	6.9	6.4	6.2	67	6
	Conductivity	400	X	X	Х	Х	300	Х	Х	Х	X	3
	Ammonia, alk/hardness	/	Х	Х	Х	Х	Х	Х	Х	Х	Х	1
	Init./Date (1999):	10/19	10/20	19/83	19/22 WY	10/23	10/247M	10/25	10/26	10/27	19/28	19/2

. )	)	 <del></del>	<u> </u>
$\supset$	Comments:		
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( )	) <del></del>		

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 Dead Creek BTR: 3622 Test Starts 10/19/99 Project: Menzie-Cura & Associates Day of Analysis **Parameter** 0 2 3 7 Sample 1 5 6 8 9 10 T (°C) 12591 21.9 /29 22.7 216 pН X X X X X X X 7.6 7.6 7.7 DO (mg/L) 7.0 78 7.6 70 7.0 0 7.8 Conductivity Х X Χ Х X X 30 375 Ammonia, alk/hardness X X Χ X X Χ X T (°C) 12592 21.7/22.8 228 22.3 pН X X Χ X X  $\overline{X}$ 78 X 7.9 DO (mg/L) 6.5 7.5 6,2 7-0 7.4  $\bar{\mathsf{X}}$ Χ Χ Conductivity X 370 310 Ammonia, alk/hardness X Χ Χ Χ Χ Х Х Х T (°C) 12593 22.6 22.7 212 229 pН X X X X Χ X X Χ 7.7 7.8 6.3 DO (mg/L) 70 7.4

	0	U F	$\nu$
Comments:			
· <b>i</b>			
			·

X

X

X

X

300

Х

X

X

Χ

X

10/26

X

X

290

10/29

6.1

X

192

X

X

10/20

000010 Date: 12/3/99 Review: haenv.doc Soratory: Aquatec Biological Sciences, South Burlington, Vermont

Conductivity

Ammonia, alk/hardness

Init./Date (1999):

7.1

375

10/19

<del>, , , , , , , , , , , , , , , , , , , </del>	-Cura & Associates	1	· · · · · · · · · · · · · · · · · · ·		d Creek	Dav	of Ana			Starts 10		
			,	<del>r -</del>	<del>,</del>		<del>,</del>		<del></del>	<b></b>	<del>,</del>	
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	1
12609	T (°C)	21.7	24	22.5								22.
	рН	7.7	X,	X	X	X	7-7	Х	X	Х	X	7.
	DO (mg/L)	6.6	5.7	512	6.0	7.0	6.8	7.2	6,5	610	5.1	5
	Conductivity	395	Х	Х	Х	Х	240 X	Х	X	Х	Х	3.
	Ammonia, alk/hardness	V	Х	Х	Х	Х	X	Х	X	Х	X	1
12610	T (°C)	22-0	27.6	22.6								22
	рН	7-9	X	Х	Х	Х	7.7	Х	Х	Х	X	7.
	DO (mg/L)	7.8	6.7	63	6.7	7,2	6.7	7.1	6,3	6.3	6.3	6
	Conductivity	415	Х	Х	Х	X	310	Х	Х	Х	Х	37
	Ammonia, alk/hardness	/	Х	Х	Х	Х	Х	Х	Х	Х	Х	
· · · · · · · · · · · · · · · · · · ·	T (°C)		22.7								1	
\ \ \	pH		Х	Х	Х	Х		Х	Х	Х	Х	
12000	DO (mg/L)		8.2									
	Conductivity		Х	Х	Х	Х		X	X	Х	X	
	Ammonia, alk/hardness		Х	X	Х	Х	X	Х	X	X	X	†
	Init./Date (1999):	10/19	10/20	10/21/	10/22	10/23	10/24	10/25 1/N	10/26	10/27	19/28	19/2

Comments: (1) 1/29 609 D sediment / notes / sediment stratification (D) of middly large = 2.0) ccd

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3633
	Test Start: October 21, 1999	Test End: October 31, 1999

					Repick	Total	#	Init Pan	Total
Sample	Repl.	# Alive	Init.	Repick #	Init.	Surv	Weighed	Wt.	Dry Wt.
12611	Α	6	TM	0	MILA	<u>(a</u>	6	34,69	35.59
	В	8	Tm	0 '	m 11/14	82	ALLIderitz	discarded	Ju
	С	9	76			9	9	35.63	36.65
	D	6	10	11/3./	& Thu ult		8	39.05	40.29
	E	9	TM			9	9	33,19	34.90
	F	10	IM			10	TO_	36.59	37.69
	G	9	J	: 		9	9	39.11	40.26
	Н	9				9	4	35.08	36.37
10010	ī • i	~	4~			<u> </u>	04	i -o i	<del>~</del>
12612	A	8	4	,		8	<del>- 8</del>	38.55	39.66
	В	7	$\mathcal{L}$	1-1	St.	-// <del>/</del>	<u> </u>	35.51	36.77
	C	10	1/1)			10,	10	32.35	36.80
	D	3	76				<u> </u>	35.08	36.5i
	E	9	<u>im</u>			7	1	34.78	35.87
	F	9	<u> 1m</u>			9	9	34.36	35.98
	G	9	JG-			9	7 J	5341.04	47.20
	Н	9 201	" ZEGI	<u>\</u>	- 9	10p	79_	45.19	47.04
40040	7 - 1								
17613	I A	10	4 Car			160	10	40 3/	4180
12613	A B	40	76			10	10	40.36	
12013	В	9	76				9	39.26	40.33
12013	B C	9	JG TM	<u></u>		9		39.26 33.68	40.33 34.99
12013	B C D	9 10 8	Tm Tm	0	Tm ula	9 10 8	9 10 8	39.26 33.68	40.33 34.99 42.35
12613	B C	9	Im Im Im			9	9 10 8	39.26 33.68	40.33 34.99 42.35 42.84
12613	B C D E F	9 10 8	TIM TIME TO THE TI		Tm 414	9 10 8	9 10 8	39.26 33.68 41.33 41.45 40.34	40.33 34.99 42.35 42.84 41.91
12613	B C D	9 10 8 10 10	TM TM TM		IM 114	9 10 8	9 10 8 10 10 9	39.26 33.68 41.33 41.45 40.34 42.22	40.33 34.99 42.35 42.84 41.91 44.29
12613	B C D E F	9 10 8 10 4 7693	TM TM TM		TM 114	9 10 8	9 10 8	39.26 33.68 41.33 41.45 40.34 42.22 40.51	40.33 34.99 42.35 42.84 41.91
12613	B C D E F	9 10 8 10 4 10 10	TM TM TM		7m 44	9 10 8	9 10 8 10 10 9	39.26 33.68 41.33 41.45 40.34 42.22 40.51	40.33 34.99 42.35 42.84 41.91 44.29 42.12
	B C D E F G H	9 10 8 10 4 7693	TM TM TM TM TM TM TM TM TM TM TM TM TM T			9 10 8 7710 9 9	9 10 8 10 10 9	39.26 33.68 41.33 41.45 40.34 42.22 40.51	40.33 34.99 42.35 42.84 41.91 44.29
	B C D E F G H	9 10 8 10 4 10 10	TM TM TM TM TM TM TM TM TM TM TM TM TM T			90 10 8 10 10 10	9 10 9 9	39.26 33.68 41.33 41.45 40.34 42.22 40.51	40.33 34.99 42.35 42.84 41.91 44.29 42.12
	B C D E F G H	9 10 8 10 4 7693	TM TM TM TM TM TM TM TM TM TM TM TM TM T			90 10 8 10 10 10	9 10 9 9	39.26 33.68 41.33 41.45 40.34 42.22 40.51 38.64 38.65	40.33 34.99 42.35 42.84 41.91 44.29 42.12 39.76 40.19
	B C D E F G H	9 10 8 10 10 14 10 10 7	TIM TIM TIMES TIMES OF THE PARTY OF THE PART			90 8 70 90 10 10 7	9 10 10 10 9 9	39.26 33.68 41.33 41.45 40.34 42.22 40.51 38.64 38.64 38.95	40.33 34.99 42.35 42.84 41.91 44.29 42.12 39.76 40.19 38.23 37.18
	B C D E F G H	9 10 8 10 4 7 10 7 10 10	JEMEN SING			90 870 10 10 10 10 10 10 10	9 10 9 9 9 10	39.26 33.68 41.33 41.45 40.34 42.22 40.51 38.64 38.95 37.28 35.81	40.33 34.99 42.35 42.84 41.91 44.29 42.12 39.76 40.19 38.23
	B C D E F G H	9 10 8 10 4 10 10 7 10	IM IM IM IM IM IM IM IM IM IM IM IM IM I			90 870 10 10 10 10 10 10 10	9 10 9 9 9 10 10 10 10 10	39.26 33.68 41.33 41.45 40.34 42.22 40.51 38.64 38.95 37.28 35.81 37.46 41.40	40.33 34.99 42.35 42.84 41.91 44.29 42.12 39.76 40.19 38.23 37.18 39.92 42.92
	B C D E F G H	9 10 8 10 4 7 10 7 10 10	TIM TIM TIME OF THE CONTROL TIME (			90 870 10 10 10 10 10 10 10	9 10 10 10 9 9 9 10 10	39.26 33.68 41.33 41.45 40.34 42.22 40.51 38.64 38.95 37.28 35.81	40.33 34.99 42.35 42.84 41.91 44.29 42.12 39.76 40.19 38.23 37.18 39.92

	14(17. 199年 119.1	
Balance QC Initial (20 mg = 19,93	) Final (20 mg = $19.95$ ) Balance Asset	#:
Date/time In II/2 15:00 Temp(°C) 81	nit 16 Date/time out 1/ 22 15-15Temp(°C)	79° Init. 111
Comments: 1		

Reviewer Date 12/6/99 nasurver doc

Laboratory Adjuated Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3633
	Test Start: October 21, 1999	Test End: October 31, 1999

₽									
Sample	Repl.	# Alive	lnit.	Repick#	Repick Init.	Total Surv	# Weighed	init Pan Wt.	Total Dry Wt.
12622	Α	7	TM		~	7	7	35,90	37.45
	В	10	15	_		10	10	33.92	35.55
Į	С	8	7	0	7m 11/14	8	18	33,32	34.81
	D	q	16		<b>VIII.</b>	9	9	35,54	37.78
	E	10	TM			10	10	36.47	38.59
	F	10	TM			10	10	32,63	34.74
	G	R		0_ 1	Tm 11/14	8	4	34.83	35.85
	Н	4	36	0	JGNH	7	4	38,00	39.57
12638	Α	10	7	-	406	DO	0	36,21	37.61
	В	10	m	1	911	10	10	32.14	33.57
	С	9	7			9	9	37.76	38.77
	D	16	5	1	<u> </u>	69	10	40.64	42.43
	E	4	16		)	9	9	35,52	36.71
	F	10	J			76	10	31.14	33.25
	G	10	TM			10	10	35.66	38.00
	Н	9	7m			9	9	37.52	39.54
12639	Α	9				9	9	34,44	35.79
	В	10	TM			10,	10	375.84	38.81
	С	8		0 1	m 11/14	8	8	34.06	36.20
	D	9				9	9	27,24	29.41
	E	10	5			10	10	28,68	31.15
	F	8		0	1G11 14	8	<u> </u>	34.61	36.40
	G	3	<del>Q</del> _	1 10/31	0	9	- 4	37.94	40.05
	Н	10	()E			10	10	37,24	39.34
12640	Λ	පි		7	AClv	0	6	270	28.52
12040	A B			0	761114	8	8	27.90	29.53
	С	G	0		JG11/14	6	9	23.40	25. A
	D	8	16		7C-11.			37.66	39.44
				0	751/14		8	25.06	26.72
1	E	10	0			/0 9	10	28.45	30.63
	G	10					17	31,90	33.71
	Н		755			10	9	<del></del>	36.64 35.53
<u> </u>	П	9	7m			(	<u> </u>	33,49	20.23

Balance QC:	Initial (20 mg =	) Fina	al (20 mg = )	Balance Asset #:	
Date/time In	Temp(°C)	Init.	Date/time out	Temp(°C)	Init.
Comments:					

Date: 12/8/99 Reviewer: hasurvwt.doc

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura	& Assoc. Project: 99033 D	ead Creek BTR: 3633	
	Test Start: Octob	er 21, 1999   Test End: October 31, 1999	

		<del></del>			Repick	Total	#	Init Pan	Total
Sample	Repl.	# Alive	Init.	Repick #	Init.	Surv	Weighed	WŁ	Dry Wt.
12641	Α	7			361/11	8	8	30.74	31.70
	В	10	7	_	_	0	10	36.83	37.75
	С	905				9	9	31,24	32.49
	D	912	7	6		91236	1313	33,61	35.62
	E	8		1	m 11/4	9	9	34,36	36.17
	F	7	Tm	0 1	JOUN	-	7	26.92	28.19
	G	4		$\sim$	7m ii  4	4	4	36,63	37.85
	Н	q	<del>`</del>			a	<del>'</del>	39.97	41.38
<del>-</del>	1 - "								11-24
	Α							1	
	В				-				
	С	<u> </u>						1	
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Batance QC	Initial (20 mg =	) Fit	nal (20 mg =	Balance Asset #:		
Date/time In	Temp(°C)	Init	Date/time out	Temp(°C)	Init.	-
Comments						

		Initial [	ry Weight Data		
Replicate	# Weighed	Initial Boat Weight (mg)	Final Dry Weight (mg)	Mean Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)
1	10	40.21	41.48	0.127	
2	10	43.62	44.84	0.122	
3	10	40.88	42.10	0.122	
4	10	43.05	44.15	0.110	
5	10	35.51	36.97	0.146	
6	10	38.68	39.32	0.064	
7	10	37.52	38.73	0.122	
8	10	38.76	40.04	0.128	0.118

## Hyalella azteca Initial Dry Wt.

Client: Menzie-Cura &	Project: 99033	BTR: 3629 / 3633
Assoc.		Cotober 21, 1999
Culture ID: 10/14	Age: /	/ days

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)
1	10	40. 211	41.48
2	10	+3.617	44.84
3	10	41. 882	42.10
4	10	43.058	44.15
5	10	35.510	36.47
6	10	38. (177	39.32
7	10	37.5.5	38.73
8	10	38.758	40.04
nitials:			
Date:			

Balance QC: Initial (20 mg = / 9,96) Asset #:	)	Final (20 mg = $19.96$ ) Balance
Date/time In 12/4 1050 Temp(°C) 82°C Temp(°C) 80 Init JG	Init.	Date/time out 12/5 12:00
Comments:		

Subset et organisme uses for acute rest sports en 14/2/199

Laboratory Aquatec Biological Sciences, South Burlington, Vermont

ATT That Invitadoc

0.127

0.122 0.110 0.146 0.064

0.122 0.126



# Aquatic Research Organisms

## DATA SHEET

I.	Organism I	History
	Species:	Hygle//g azteca
,	Source:	Lab reared Hatchery reared Field collected Field collected
		Hatch date 10/9-10/99 Receipt date
		Lot number 1009 99 Hg Strain ALO
		Brood Origination US FWS MO
II.	Water Qua	lity
		Temperature 24 °C Salinity ppt DO 7.6
		pH 7/4 Hardness 2/80 ppm
III.	Culture Co	_
		System: FW STUTIC / CNKW9/
	1 deG	Diet: Flake Food Phytoplankton Trout Chow
noc.	10/19/99	Diet: Flake Food Phytoplankton Trout Chow  Brine Shrimp Rotifers Other  Prophylactic Treatments:  Comments:
	N/ 17.1	Prophylactic Treatments:
,	Acute	Comments:
Sed to	10/19/99 \$ 1.12/199	<del></del>
ix iv	. Shipping In	Mormation
<2T C	~ ~1~3/99	Client: <u>AUA ICH</u> # of Organisms: <u>2500</u> Carrier: <u>F80 &amp; X</u> Date Shipped: <u>10/18/199</u>
3/4 T	5	Carrier: Date Shipped: 10/18/99
Ri	ologist:	Stan Sentili
2.	0108.31.	10/20/9956
		$1 - 800 - 927 - 1650$ $= 21.0^{\circ}$ C
	PC	D Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650 $\Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow \Rightarrow$
		Do= 8.0
		Cond,=1,700 Feb YCT/Sel/9C
		10 1-15el/9C

	-Cura & Associates		<del>-</del> -	33 Dead		Day	of Ana				10/21/91	
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	10
12611	T (°C) #	22.9	23.1	31.1	37. 4 X	12.1 A	2193	22.4	32 32 A	22.09	21.9	122
	pH	7.8	X	X	X	X	7.6	X	x	X	X	7.
	DO (mg/L)	70	7.4	7.4	7.1	77	6,9	6.7	6.7	6,4	6.3	
	Conductivity	^	×	'x'	x x	×	23°	X	X	X	X	310
	Ammonia, alk/hardness	360/	×	×	×	×	X	X	Х	Х	Х	レ
12612	T (°C)	1,6.	21356		,							22.
	pH	7,9	X	) X	X	X	7.7	X	X	X	X	7.
	DO (mg/L)	/0	7.1	6.9	6.3	7.4	6.5	6,7	6.0	6,0	7.5	5
	Conductivity	360	X	X	×	Х	260	x	X	X	X	33
	Ammonia, alk/hardness		X	X	X	X	, <b>X</b>	X	X	X	Х	~
12613	T (°C)	207										22.
	pH	7.9	X	X	X	X	7.8	X	X	X	X	7-
	DO (mg/L)	7.1	75	6.9	6.2	6.9	7.0	6.8	5.5	6.7	7.8	6.
	Conductivity	350	×	X	X	×	260	X	X	X	X	34
	Ammonia, alk/hardness	//	×	X	×	×	×	×	×	X	X	3/2
	init./Date (1999):	10/21	10/22	10/23	10/24/1	10/25 1/1/1	10/26	10/27	19/28	19/29	19/39	19/3

Comments: H. aztece added 10/21/99 JG, B)

Temperative messivement reflects mossurement at Two locations

(Two impresentable test bearers) on

Date: 12/8/99

senv.doc horatory: Aquatec Biological Sciences, South Burlington, Vermont

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	e-Cura & Associates	<del></del>				Dav	of Ana	lvsis		<del>-</del>		—
						<del>,</del>		·			T	_
Sample	Parameter	0,	1	2	3	4	5	6	7	8	9	1
12614	T (°C)	227										23
	рН	7.8	Х	X	Х	X	7.7	X	Х	Х	Х	7.
	DO (mg/L)	7.1	6.7	6.8	6.3	6.9	6.7	60	G4	5.8	7.1	5.
	Conductivity	350	Х	Х	Х	Х	280	Х	X	X	X	3
	Ammonia, alk/hardness		Х	Х	Х	Х	Х	X	Х	Х	X	V
12622	T (°C)	22.7										22
	рН	7.8	Х	X	Х	Х	7.5	Х	Х	Х	X	7.
	DO (mg/L)	6,0	8-0	7,3	75	7.9	69	6.7	70	6.8	7.7	7.
	Conductivity	400	Х	X	Х	Х	780	Х	Х	Х	X	30
	Ammonia, alk/hardness	V	Х	Х	Х	Х	X	Х	X	Х	Х	V
12638	T (°C)	27										20
	pH	73	Х	Х	Х	Х	7.8	Х	Х	Х	Х	7
	DO (mg/L)	6,7	7.7	7.5	76	7.8	7.0	lodo	6.2	5,9	7.0	16
	Conductivity	360	Х	Х	X	Х	260	X	Х	Х	X	3.
	Ammonia, alk/hardness		X	Х	Х	Х	X	Х	X	X	X	L
	Init./Date (1999):	10/24	19/22	10/23	10/24 MN	10/25	10/26	10/27	19/28	10/29	10/30	10/

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$\preceq$	Comments:		
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Review: Date: 12/8/99 haenv.doc

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Ct. Melizie-	Cura & Associates	1.10		33 Dead		Day	of Anal		10,00		10/21/99	
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	10
12639	T (°C)	23.2-										22
	рН	7.8	Х	X	Х	Х	7,5	X	X	Х	X	7.5
	DO (mg/L)		6.4	2.8	58	66	5.6	5.4	5.6	5.1	6.2	<del> </del>
	Conductivity	350	X	X	X	X	250 X	X	X	X	X	3.20
	Ammonia, alk/hardness	V	×	X	X	Х	X	X	X	X	X	V
12640	T (°C)	,23,3										.2.2
	рН	17	×	X	X	X	7.6	X	X	X	X	7.
	DO (mg/L)	6.6	74	6.8	6.7	14	6,5	6.4	5.7	5,3	105	6.
	Conductivity	350	×	X	L X	Х	240	X	X	X	X	341
	Ammonia, alk/hardnoss	V	×	X	Х	Х	X	X	Х	×	Х	V
12641	T (°C)	227										ప్రస్తే.
	pH	7.6	X	X	Х	X	7.5	X	X	X	Х	7.6
	DO (mg/L)	6.3	70	6.4	5.6	6.9	5.8	5.0	49	5.1	6.4	5.
	Conductivity	400	X	X	X	×	250	X	X	X	X	350
	Ammonia, alk/hardness		X	×	X	×	X	X	Х	Х	X	1
	Init./Date (1999):	10/21	19/32	10/222	19/24	19/25	10/26	10/27	19/28	10/20	10/20	19/31

Comments:

Review: Date: /2/8/99

haenv.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3641
	Test Start: October 10, 1999	Test End: October 20, 1999

							<u></u>			
					Repick	Total	#	Init Pan	Total	
Sample	Repl.	# Alive	Init.	Repick #	Init.	Surv	Weighed	Wt.	Dry Wt.	
12664	Α	9	m			10	10	39.18	40.98	BLL
	В	10_	12				10	32.99	35.06	SaMPAS
	С	9_	RB			9	9	41,23	43.62	70
	D	10	LS				10	36.75	39,51	MARNIC
	E	10_	TM			10	10	32.17	35.43	Santas Santas Chronic restric
	F	9	TM			9	9	40.12	42.65	ر پیکار
	G	10				/0	10	36,04	38.49	
	Н	jo	TM			10	10	35,76	38.29	
						/->				
12665	A	4				4	9	27,97	31,79	
	В	10	RB			10	10	29.88	33,46	
	С	10_				10	10	29,18	32.64	
	D	10	TM			10	10	28.55	32.54	
	E	iQ	m	~		10	10	29.28	33.98	
	F	4	45			9	9	28,25	32,36	\.
	G	10	RB			10	10	31.97	35,91	
	Н	10_	LS			10	10	24.38	28.25	
40000		()	0.0	<del></del>			0	سرا ادم	00.00	. \
12666	A	<u> </u>	RB			9		34.15	37,52	
	В	10	TM			10	10	34.11	38.09	
	С	10_	TM			10	10 35.53	24.10-	G39,32	1
	D	10	12			· /Ø_	10 37.52	33,53		
	E	10	Tm			10	10 29.66		1633.32	
	F	19	TM				10 32.5		G 36.79	
	G	9	4				9	32.96	37.95	
	Н	10	RB			10	10	31.85	34,27	Init. Par
40074	ΙΔ Ι		1.,		معامد	10		20.00	07.01	25.12
12671	A	<u>IQ</u>	Jm-		+0 fw	10	10	20.81	27.91	
	В	8	"LS			8	8	36.79 39.78	33,41	30.63
	С	10	m			19	10	27/18	32.94	30.06
	D	10	RB-			10	10	23.66		33.29
i	E	9	RB			10	10	36.13	32.75	29.46
'	F	10	RB			10	10	29.22	33.01	29.84
	G	10	TM			10	10	21.52	N - 🔺 1	32.94
	Н	10	m			10	10	124.02	36.32	32.14

١	Balance QC:	Initial (20 mg =	19.92	Final (20 r	ng = 1292 )	Balance Asset #	t:	
	Date/time In II/	Temp(°C)	5/2 Ir	nit. 16	Date/time out [[]	23 12:45 Temp(°C)	82-	Init 7 6
	Comments: 1	गुन्द						

\_ Date: 12/8/99. O pan wits. recorded in wrong Spaces; Corrected. IG 11/22

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

151/23 \* Truitial par wts, for 668 recorded

in spaces for 12671 Init. p. 1

Client:	Menzie	-Cura &	Assoc.	Project: 9	99033 De	ad Creek	BTR	: 3641	-	
				Test Start	t: Octobe	r 10, 199	9 Test	End: Oc	tober 20,	1999
Sample	Repl.	# Alive	Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	Tuit Par
12668	Α	10	Tm	- 1		10	10	125.12	279136	30,8
	В	iO	15			10	10	30.63	29.62	26.7
	С	10	Tm			10	10	30.06	32.17	29.9
	D	10	RB	_ !		10	10	38.29	26,88	23,6
	E	9_	LS			9	a s	14 A 19	28.60	26,1
	F	10	TM	_		10	10_	29.84	32.29	29,7
	G	9	RB	-		9	9	32.94	23.68	21.5
	Н	10	TM			10	(i)	32.14	26.59	24.

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Н				

Balance QC	Initial (20 mg = \ 9, 9)	}	Final (20 mg = )	Balance Asset #:		
Date/bime In	Temp(°C)	inst	Date/time out	Temp(°C)	Init.	
Comments						—,

Reviewer \_\_\_\_ Date \_\_\_\_ of Truit, pan wits. for '671 recorded in hasunvar doc
Laboratory Aquatec Biological Sciences. South Burlington. Vermont Spaces for 12668 Truit, fan wits.

Corrected. 11/23 JG

		Initial D	ry Weight Data		
Replicate	# Weighed	Initial Boat Weight (mg)	Final Dry Weight (mg)	Mean Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)
1	10	26.13	26.42	0.029	
2	10	28.00	28.23	0.023	
3	10	33.61	33.98	0.037	
4	10	24.48	24.84	0.036	
5	10	25.80	26.22	0.042	
6	10	29.37	30.00	0.063	
7	10	29.15	29.68	0.053	
8	10	26.92	27.37	0.045	0.041

### Hyalella azteca Initial Dry Wt.

Client: Menzie-Cura &	Project: 99026 99033	BTR: 3152 / 3153
Assoc.		3641 0
Culture ID: 10/1	Age: /O day	ys (UN 10/9/99)

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)
1	10	26.13	26.42
2	10	28.00	28.23
3	10	33.61	33.98
4	10	24 48	24 84
5	10	25.80	018 22
6	10	29.37	30.00
7	10	2915	29.68
8	10	26.92	57.37
Initials: 77			
Date: 13 899			

Balance QC: Initial (20 mg = 19 98' ) Asset #:	Final (20 mg = 19.96) Balance
Date/time In 学 ら ※Temp(°C) うこう Init. Temp(°C) りゃく Init. デ	m Date/time out 12/9/99 15:10
Comments: 13/4/44 Proves for Fr ~ 32 mi	a (over sound)

Granisms preserved (subsample) on 10/9/99
Organisms used for 2002 resis ininered 10/10/99

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# Aquatic Research Organisms

## DATA SHEET

I.	Organism I	listory
	Species:	Hya/e//q az Teca
	Source:	Lab reared
		Hatch date 09/29/99 Receipt date
		Lot number 09.29 99 49 Strain AV20
		Brood Origination USFW MO
II.	Water Qua	lity
		Temperature 25 °C Salinity ppt DO 716
		pH 7: 4 Hardness 200 ppm
ш.	Culture Co	nditions
		System: FW STATIC
		Diet: Flake Food Phytoplankton Trout Chow
		Brine Shrimp Rotifers Other
		Prophylactic Treatments:
		Comments:
	·	*** - :
IV.	Shipping I	nformation
		Client: AQUIATOCH # of Organisms: 1500 +
		Carrier: F80 { } Date Shipped: 9-30-99
Bio	ologist:	Aten Sintshi

1 - 800 - 927 - 1650

#### Organism Holding and Acclimation

Species. Hyalella azteca	Date Received: 10/1/99 No. Rec. 1500
Supplier ARO	Hatch Date: 9/29/99
Apparent Condition. Excellent	Cuiture ID: 10/1

Acclimation / Holding Procedures: Transfer to holding culture boxes, and laboratory water. Acclimate to water to be used for testing (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.

<u>Daily Feeding: 1:1 mix of Selenastrum / YCT. 1-3 mL</u> (maintain hint of green algal coloration on culture box bottom). Also, pinch of ground Tetrafin/Ceraphyll. Do not allow excess food/fungus to accumulate.

Monitoring: Examine over a light box daily, record apparent condition. Temperature daily; pH, D D on Mon., Weds., Fri., (miniumum). Conductivity weekly.

Test stans record date, time, initials for sediment test and SRT test starts.

1999	1	l			Cond			Water	!	
Date	Fed	Temp	ρН	D.O.	uct.			Chg.	Age (Days)	Init.
<del></del>	ميدان	<del></del>		72.					<del></del>	
10/1	3/2	<u> </u>	7.4	4.4	<u>1,300</u>		-		2 Normal	136
40.00	+ 1145						<u>-</u>	1660	1000	
10/2	Wy.	20.5		<del></del>	<del></del>		<del></del>	25%	3 Normal	13G
19/3	50476	21.0	-		1		· · · · · · · · · · · · · · · · · · ·	]	14 N	170
	De Co	<u> </u>	<u> </u>		<u>:</u>	<u>:</u>	<u>'</u>	1	1 10	JG
10/4	22/20	20.71						150%	15 N	UG
	5/									
10/5	المراجع	210	7.9	14	750	<u></u>	1	150%	16 N	JG
	-1/	- 1							<del></del>	
<u> 10/6</u>	م را الد	225							7	
10/7	<u> </u>	1. A. I	7.8	=1	1:00		<del></del>	<del></del>	0	-W
	(P) VC+	3(1· 7 )	<u> </u>	<u> </u>	400				8 Nirmal	1 77
10/B	-C- 501	32 2 1			<u> </u>	<u> </u>			9 Normal	sm
	<del></del>	<u> </u>			<del>-</del>				100.00	31.1
10/9	xtel	200							10 Normal	G
										:
10/10	YC Kel	22.3							11 Normal	13G
4044	<del></del>							<del></del>		<del></del> -
10/11								1	12	<del></del> .
10/12	<del></del>	· · · · · · · · · · · · · · · · · · ·			;	<del>T</del>	1	1	13	<u> </u>
10/12	1					<u>!</u>		1	1 10	<u> </u>

\* N = normal, appear healthy. Record # dead if any observed.

Sediment test start (Date/time/Init.) 10/10/99 SRT test start: (Date/time/init.) 10/8/99

ct: Menzie	-Cura & Associates	Proj	ect: 990	33 Dead	Creek			BTR: 36	41 Test	Starts 10	/10/99	
				-		Day	of Ana	lysis				
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	-
12664	T (°C)	22.8	215	23.1	22.9	32.8	22,8	229	23.2	23:2	23,1	7
	рН	8,0	X	Х	Х	Х	8.0	X	X	Х	X	T
	DO (mg/L)	7.4	7.4	6.9	7.1	7.1	7.6	7.9	6.4	6.9	7.0	1.
	Conductivity	390	Х	Х	Х	Х	350	Х	Х	X	X	3
	Ammonia, alk/hardness Sulfide		Χ	Х	Х	Х	Х	Х	Х	Х	Х	
12665	T (°C)	22,6	21.8	22.9	230	23.1	23.5	23,2	23 <i>.</i> 5	33.2	23,7	2
	рН	7.7	Х	X	Х	Х	5.79	Х	X	Х	X	{
	DO (mg/L)	64	6.6	6,2	(e-1	6,0	\$6.3	7.2	4.8	5.9	4.7	5
	Conductivity	410	Х	X	Х	Х	370	X	Х	Х	Х	4
	Ammonia, alk/hardness Sulfide	V	Х	Х	Χ	Х	Х	Х	Х	Х	Х	
12666	T (°C)	J2.S	21.9	22.9	23.0	23.1	23,4	23,2	23.7	23.4	23.8	7
	рН	4.5	X	X	Х	Х	7.6	X	X	X	X	1
	DO (mg/L)	5,0	4.0	4.1	4.0	3.6	61	Ce.8	3.5	47	5.1	4
	Conductivity	420	Х	Х	Х	Х	360	Х	Χ	X	X	3
	Ammonia, alk/hardness Sulfide	/	Х	Х	Х	Х	Х	Х	Х	Х	Х	
··· <del>·</del>	Init./Date (1999):	10/101	19413	10/12	19/13	10/14	10/15	10/16	19/17	10/18	10/19	10/

Comments: H. 22/ec2 added to beakers 10/10/99 14:30 556

\* Gave 12660 an extra renewal manually 10:00 Jm 10/14/99

Review: \_\_\_\_\_ Date: 12/07/9\_ Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ct: Menzie-C	Cura & Associates	Proj	ect: 990	33 Dead	Creek			BTR: 36	11 Test	Starts 10	/10/99	
						Day	of Anal	lysis				
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	1
12667 16	T (°C)	32.8	21.9	22.6	22.8	230	23.5	23.2	23.4	236	.>3. ¥	21
· <del>1</del> 1	pH	7.6	X	X	X	X	7.9	X	X	X	X	E
	DO (mg/L)	6, J.	6,9	6.7	6.()	56	7-3	G7.2	6.1	67	45,6	8
	Conductivity	300		X	X	X	380	X	X	X	X	40
	Ammonia, alk/hardness Sulfide	/	×	X	X	X	X	X	X	X	X	1
12668	T (°C)	<i>3</i> .>, 7	21.8	228	.23.1	23.2	233	23.3	23.4	23.5	234	2
	рН	7.7	x	X	X	X	8.0	X	X	X	XF	
	DO (mg/L)	7.4	7.5	6.9	(0.5	(o.7	7.3	7.7	6.9	67	1976	1, 1
	Conductivity	420	X	X	×	X	370	'x	X	×	X	3-
	Anwnonia, alk/hardness Sulfide		X	Х	×	X	X	×	X	X	X	L
	T (°C)	<del> </del>										
	рН		X	X	X	X		X	X	X	Х	
	DO (mg/L)	-									`	<del>                                     </del>
	Conductivity	:	×	Х	x	Х		×	х	Х	X	
	Ammonia, alk/hardness Sulfide	•	×	×	X	X	X	×	x	×	X	
	Init./Date (1999):	10410	1043	1912	19/13	19/14	10/15 <sub>G</sub>	19/18	19/17	10/1B	10/19	10/

Comments:

Review: \_\_\_\_\_\_\_ Date: \_\_\_\_\_/ 2/3/49
L-\_\_\_ratory: Aduatec Biological Sciences, South Burlington, Vermont

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#### **ALKALINITY & HARDNESS WORKSHEET**

BTR Number: Several Project #: 99033 Analyst: LS

Species: Hyallela azteca Analysis

Test Facility: Aquatec Biological Sciences, South Burlington, Vermont Date: 10/13/99 12/2/99

Project: Menzie-Cura Dead Creek Acute Tests 12/7/99

		1	ALI	KALINITY	,	<del> </del>	НА	RDNESS	
	Sample	Sample	Initial	Final	Alkalinity	Sample	Initial	Final	Hardness
Date	Type	ml	ml	ml	(mg/L)	ml	ml	ml	(mg/L)
									,
10/10/99	12664 Day 0	50	35.9	37.2	26.0	50	34.0	42.0	160.0
10/10/99	12665 Day 0	50	37.2	39.2	40.0	50	0.8	7.9	142.0
10/10/99	12666 Day 0	50	39.2	41.5	46.0	50	7.9	16.0	162.0
10/10/99	12668 Day 0	50	41.5	43.4	38.0	50	16.0	23.5	150.0
10/10/99	12671 Day 0	50	43.4	44.9	30.0	50	23.5	30.2	134.0
10/19/99	12546 Day 0	50	0.2	2.3	42.0	50	0.1	11.6	230.0
10/19/99	12547 Day 0	50	2.3	4.6	46.0	30	11.6	17.7	203.3
10/19/99	12548 Day 0	50	4.6	6.9	46.0	50	17.7	26.8	182.0
10/19/99	12549 Day 0	50	6.9	9.1	44.0	50	26.8	36.7	198.0
10/19/99	12550 Day 0	50	9.1	11.2	42.0	50	36.7	45.7	180.0
10/19/99	12551 Day 0	50	11.2	13.4	44.0	50	0.1	9.0	178.0
10/19/99	12552 Day 0	50	13.4	15.9	50.0	50	9.0	19.6	212.0
40/40/00	10500 0				•••	5.0			
10/19/99	12589 Day 0	50	15.9	17.8	38.0	50	26.6	33.7	142.0
10/19/99	12590 Day 0	50	17.8	19.7	38.0	50	33.7	40.7	140.0
10/19/99	12591 Day 0	50	19.7	21.6	38.0	50	0.2	18.2	360.0
10/19/99	12592 Day 0	50	21.6	23.6	40.0	50	18.2	27.5	186.0
10/19/99	12593 Day 0	50	23.6	25.4	36.0	50	27.5	37.1	192.0
10/19/99	12609 Day 0	50	25.4	27.5	42.0	50	37.1	46.6	190.0
10/19/99	12610 Day 0	50	27.5	29.5	40.0	50	0.1	11.7	232.0
10/21/99	12611 Day 0	50	0.4	2.6	44.0	50	15.7	24.3	172.0
10/21/99	12612 Day 0	50	2.6	4.5	38.0	50	24.3	32.4	162.0
10/21/99	12613 Day 0	50	4.5	6.4	38.0	50	32.4	40.5	162.0
10/21/99	12614 Day 0	50	6.4	8.0	32.0	50	0.1	8.0	158.0
10/21/99	12622 Day 0	50	8.0	10.2	44.0	50	8.0	17.6	192.0
10/21/99	12638 Day 0	50	10.2	12.1	38.0	50	17.6	25.3	154.0
10/21/99	12639 Day 0	30	12.1	13.2	36.7	20	25.3	28.7	170.0
10/21/99	12640 Day 0	50	13.2	14.8	32.0	50	28.7	37.8	182.0
10/21/99	12641 Day 0	50	14.8	16.9	42.0	50	37.8	46.5	174.0
					.=.+				
		<del></del>				<u> </u>			

) 12/8/95

### **ALKALINITY & HARDNESS WORKSHEET**

BTR Number	Several	Project # <u>99033</u>	Analyst:	LS	
Species:		a azteca	Analysis		
Test Facility:	Aquatec Biological Science	es, South Burlington, Vermont	Dates:	11/21/99	12/2/99
Project:	Menzie-Cura Dead	Creek Acute Tests		12 <i>/7/</i> 99	

	<del></del>	Ī	ALI	KALINITY	,	_	НА	RDNESS	3
	Sample	Sample	Initial	Final	Alkalinity	Sample	Initial	Final	Hardness
Date	Type	ml	ml	ml	(mg/L)	ml	ml	ml	(mg/L)
	_								
10/20/99	12664 Day 10 HA	50	32.1	34.0	38.0	50	24.1	31.8	154.0
10 <i>/</i> 20 <i>/</i> 99	12665 Day 10 HA	50	34.0	36.3	46.0	50	31.8	39.8	160.0
10/20/99	12666 Day 10 HA	50	36.3	38.4	42.0	50	39.8	46.5	134.0
10/20/99	12668 Day 10 HA	50	38.4	40.1	34.0	50	0.2	7.4	144.0
10/20/99	12671 Day 10 HA	50	40.1	42.2	42.0	50	7.4	15.0	152.0
10/29/99	12546 Day 10 HA	50	1.9	3 6	34.0	50	19.1	25.3	124.0
10/29/99	12547 Day 10 HA	50	3.5	5 4	36.D	50	25.3	31.5	124.0
10/29/99	12548 Day 10 H4	50	5.4	7.2	36.0	50	31.5	37.1	112.0
10/29/99	12549 Day 10 HA	50	7.2	8.9	34.0	50	37.1	42.7	112.0
10/29/99	12550 Day 10 HA	50	8.9	10.4	30.0	50	42.7	48.3	112.0
10/29/99	12551 Day 10 HA	50	10.4	12.1	34.0	50	0.3	6.1	116.0
10/29/99	12552 Day 10 HA	50	12.1	13.9	35.0	50	6.1	12.3	124.0
	40506 D 40 H4		45.0	45.0	22.0	50	40.0	40.5	404.0
10/29/99	12589 Day 10 HA	50	13.9	15.8	38.0	50 50	12.3	18.5	124.0
10/29/99	12590 Day 10 H4	50	15.8	17.7	38.0	50	18.5	24.1	112.0
10/29/99	12591 Day 10 HA	50	17.7	19.2	30.0	50	24.1	30.5	128.0
10/29/99	12592 Day 10 HA	5C	19.2	21 0	36.0	50	30.5	36.4	118.0
10/29/99	12593 Day 10 HA	50	21.0	22 5	30.0	50	36.4	42.0	112.0
10/29/99	12609 Day 10 HA	50	22.5	25.1	52.0	50	42.0	48.7	134.0
10/29/99	12610 Day 10 HA	50	25.1	27.0	38.0	50	0.1	6.9	136.0
10/31/99	12611 Day 10 HA	50	29.5	31.1	32.0	50	11.7	19.8	162.0
10/31/99	12612 Day 10 HA	50	31.1	32.9	36.0	50	19.8	28.0	164.0
10/31/99	12613 Day 10 HA	50	32.9	34.7	35.0	50	28.0	36.4	168.0
10/31/99	12614 Day 10 HA	50	34.7	36.3	32.0	50	36.4	44.7	166.0
10/31/99	12622 Day 10 HA	50	36.3	38.2	38.0	50	0.2	8.9	174.0
10/31/99	12638 Day 10 HA	50	35.2	39.9	34.0	50	8.9	16.7	156.0
10/31/99	12639 Day 10 HA	50	39.9	41.5	32.0	50	16.7	24.5	156.0
10/31/99	12640 Day 10 HA	50	41.5	43.2	34.0	50	24.5	32.8	166.0
10/31/99	12641 Day 10 HA	50	43.2	45.0	35.0	50	32.8	40.6	156.0

1218/99

Client: Menae-Cura	Project:	9903)	BTR:	3629	
Sample Description: (	Day O	Ha. 10/21			
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										ı
			ALKA	LINITY			HARD	NESS		
Sample	Sample	Sample Vol.	Titrant Init.	Titrant Final	Analyst Date/	Sample Vol.	Titrant Init.	Titrant Final	Analyst Date/	Data entered
ID	Date		Vol.	Vol.	Init.		Vol.	Vol.	Init.	Init.
12611	1024	50nJ	04	W.6	12/218	50m	15.7	243	12/1 48	
112			12.6	4.5	<u> </u>		24.3	32.4		
13			4.5	10.4			32.4	40.5		
+14			10.4	18.0	1		0.1	8.0		
12022			18.D	10.2			8.15	17.10		
38		+	10.2	112.1			17.60	25.3		
39	·	30m	12.1	13.2	1	20M	25:3	28.7		
40		50m	13.2	14.8		50ml	28.7	37 8		
1 41	1	I	14.8	110.9	1		378	37.8	1	
				100.1	İ		2720			
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Client: Manze-Cura	Project:	9903	3	BTR:	3615	
Sample Description:	Day C	101	9			

		ALKALINITY HARDNESS								ľ
		Sample	Titrant	Titrant	Anglian	Camala	Titrant	Titrant	Analyst	Data
Sample	Sample	Vol.	Init.	Final	Analyst Date/	Sample Vol.	Init.	Final	Date/	entered
ID	Date	_	Vol.	Vol.	Init.		Vol.	Vol.	Init.	Init.
12546	1019	50ml	(12	a 3	عيد فهاف	DN	0.1	11.6	12/7 48	
47			2.3		1	30,004	11.60	17.7	1	
اع			46	6.9		50m1	17.7	21c.8		
149			6.9	GI		3277	268	20.7		
50	11		91	115	-  -		30.7	45.7		
51	<u> </u>		11.2	B.4	:	<del></del>	0.1	90		
552			13.4	159	1	~	90	19.60		
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Client: Menzie-Cura	Project:	99033		BTR: 3622
Sample Description: ]	Day D	H.a	10/19	

			ALKA	LINITY		HARDNESS						
		Sample	Titrant	Titrant	Analyst	Sample	Titrant	Titrant	Analyst	Data		
Sample	Sample	Vol.	Init.	Final	Date/	Vol.	Init.	Final	Date/	entered		
ID	Date		Vol.	Vol.	Init.	,	Vol.	Vol.	Init.	Init.		
12589	10/19	50ml	15.9	17.8	12/2 48	Dom	26/0	337	12/7 48			
190			17.8	19.7			33.7	40.7				
91			19.7	216			0.2	18.2				
192			21.6	23.U			18.2	275				
+93	/		23.4	25.4			27.5	37.1				
12609			25.4	27.5			37.1	46.6				
1610	$\perp$		27.5	29.5		4-	0.1	11.7	1			
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Client: MINZIE-Cura Project:	94033	BTR:	
Sample Description:	Day D	HA/CT	

				ΔΙΚΔ	LINITY			HARD	NESS		l	
1			Sample	Titrant	Titrant	Analys:	Sample	Titrant	Titrant	Analyst	Da	ta
-	Sample	Sample	Vol.	init	Final	Date/	Vol.	Init.	Final	Date/	ente	-
	10	Date		Vol.	Vol.	Init.		Vol.	Vol.	Init.	In	t.
	12:011	1019	50m	37.8	398	17:34	50mi	30.2	37.4	101345	11/13	ęв
	2:12		60 50	39.8	418	10/28		37.4	45.0			$oxed{oxed}$
	17113	10/19		418	43.7	的法区		0.8	90			
	12114	10/9	5)	0.4	25	13.35		90	165			
	17117	10/9	50	2.5	4.4	191.35		1105	24-1		L	
	12138	1019	3	4.4	10.00	13.5		24.1	322			
	12639	1019	$^{\circ}$	10.12	83	1038		32.2	386			
	≥14D	10/9	50	<u> </u>	100	19138		38.6	46.1			
	25-1	1019	5	DO	120	01318	#X 32	0.6	5.2	<b>→</b>		L
23		i i										
12546	1054c	10/7	50	13.0	135	13/2 X	50m	1 Ko. 4	23.1	10348	1 = 2	RB
12547	7 بريخز	107	50	13.5	15.3	, 2 /2 /F	1	23.1	28.7	-		<u> </u>
2 548	المجين المستحطة	シェ	50	15.3	17.0	1011348	į	28.7	34.60			
12 549	105mg	:017	50	170	18.7	10/12/15		34.6	40.6			
12550	10550	1017	50	18.7	20.4	1938		40.10	40.5			
12551	12551	シュ	50	204	222	1613 8		0.6	63			
12 552	WEST.	1017	50	22	240	1313 5		6.3	12.7			
12569	1258	10/3	BK	24.0	25.4	13.2 %		p.7	19.0			
12590	2590	رار چ/ار		25.4	2109	15 2 5		19.0	255		<u> </u>	
12561	1501	10/8	50		28.3	عمويزر		25.5	493		( )	
1252	2592	10:1/8	50	28.3	29.9	13.2		1.0	7.3			
1253	12543	15/8	50	299	31.3	1.1300		7.3	13.2		į !	
12601	10209	/ <u>5/8</u>	50	3.3		10/34		13.2	20.0		i	
126€	1100	1018	50	33.0	34.4	10138		20.0	27.8		:	
12615	10015	10/8	8	24.4	359	131315		27,8	34.0			
	12:004	10/10	50	309	372	جمد 3، در		34.0	42.0 19			
	3065	10/10	50	37.2	39.2	13/3 P						
	13/200	101:0	50	39.2	-41.5	101130		7.9	16.0			
	13/1/18	161:0	50,50,50,50	41.5	43.4	1313 8	;	16.0	235	\		
	121171	الأزار	50	43.4	44.9	12/3/	, V	16.0 235	30.2	- 4		1
	l.					. , ,						

	Client	: Menz	e-Cur	QP	roject:	99,03	'3	BTR	: 136	41	
	Samp	le Desc	ription	1: //a	u 10	$\mathcal{H}_{\mathcal{A}}$	+ (1	1	: 36. 10/20	)	
									/		
				ALKA	LINITY			HARD	NESS		
	Sample	Sample	Sample Vol.	Titrant Init,	Titrant Final	Analyst Date/	Sample Vol.	Titrant Init.	Titrant Final	Analyst Date/	Data entered
	ID	Date	VOI.	Vol.	Vol.	Init.	V 61.	Vol.	Vol.	nit.us	
$ \mathcal{L} $	1210104	10/20	50ml	132-1	134.0	12/2/18	50nl	24.1	31.8	50ml	
Ha. Y	165	1		134.D	1363			31.8	139.8		
·/· <b>~</b> · /	100			36.4	38.4			39.8	46.5		<u></u>
	108		<del></del>	38.4	40.1		<b></b>	9.2	74		<del> </del>
	J 71			140.1	142.2	<u> </u>	<u> </u>	7.4	13.0	<u></u>	<del></del>
	126104	10/20	50 mJ	42.2	144.2	! ! ID/2 UR	50ml	150	225	12/1 1/2	
	165	1910	1	44.2	410.0	1 1	JUMA_	225	29.5	1777	
C.+.<	100			146.0	47.9			245	309		
( )	66   68   - 71			102	1.8			3/04	42.4		
	1-71	<u> </u>		1.8	3.9		1	04	17.9	4	
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Aquates Biological Sciences South Burlington, VT

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J3 1111171 ( 1414_			
Client: Min De - Cura Project:	24033	BTR: 3615	
Sample Description:	Daylo	H.a.	

		<u> </u>	ALKA	LINITY			HARD	NESS			
Sample ID	Sample Date	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data enter	ed
	10/29	50ml	19	3.6	المراء 84	50ml	19.1	25.3	"kuys		_
12547			36	5.4			25.3	31.5	1		
12548			5.4	7.2			31.5	37.1			
12549			7.2	89	!		37.1	42.7			
12550			8.9	10.4	· 1	-	427	483			
1355			10.4	12/	<del>` </del> -	-4-	0.3	<u>[0.1]</u>			-
12552	. 4-		12.1	13.9	<u>_</u>		(o.1	<i>[2.3]</i>	<u> </u>	_+	
12589	10/29	50ml	13.9	58	القراء وكل	50mi	12.3	18.5	11/2145	1/23	8B
12590	1		15.8	17.7	1		185	24.1	<u>_</u>		
12591			17.7	192		1	24.1	30.5			
2592			19.2	210		<del>   </del>	50.5	36.4			
12593			<u> 21.0</u>	225		<del>                                     </del>	34.4	420			
124609			225	25.1		<u> </u>	42.0	48.7			
12610		<u></u>	<u> 45./</u>	27.0			0.1	10.7		<u> </u>	
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Client: Menzie - Cura	Project:	99033	BTR:	3629/	3633
Sample Description:	Day 10	H.a.	10/31		

			ALKA	LINITY		· · · · · · · · · · · · · · · · · · ·	HARD	NESS		
Sample ID	Sample Date	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init.
12/01	10/31	50ml		31.1	12/2/18	50ml	11.7	19.8	12/748	
112	10,0		29.5 31.1	32.9	11	1	19.8	28.0	7.03	
13			32.9	34.7			28.0	36.4		
111			34.7				30.4	44.7		
12622			303	36.3			0.2	89		
1 38			38,2	39.9			8.9	16.7		
39			39.9	41.5			16.7	24.5		
1 40			41.5	43,2			84.5	<i>32.8</i>		
41	ــــــــــــــــــــــــــــــــــــــ		43.2	450	1	1	328	40.60		
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		onia Analyses (Total, m Dead Creek / Project 99	- •
Sample	Porewater	Day 0 Overlying	Day 10 Overlying
ID		Water	Water
12546	6.3	1.4	<0.5
12547	23.1	6.2	2.5
12548	17.3	4.1	0.5
12549	7.4	1.7	0.6
12550	9.3	2.2	0.9
12551	5.9	1.5	0.9
12552	•	<0.5	<0.5
12589	2.9	0.7	0.7
12590	4.4	0.8	<0.5
12591	2.1	0.5	<0.5
12592	5.7	1.6	0.7
12593	13.3	3.0	0.5
12609	2.2	< 0.5	<0.5
12610	7.1	1.2	<0.5
12611	12.9	2.2	<0.5
12612	2.4	0.6	<0.5
12613	2.7	0.6	0.7
12614	3.5	0.8	<0.5
12622	•	<0.5	<0.5
12638	4.0	0.9	0.5
12639	1.6	0.7	8.0
12640	0.6	<0.5	<0.5
12641	6.4	2.1	1.1
12664	<0.5	<0.5	<0.5
12665	10.3	3.4	1.8
12666	6.7	2.2	2.3
12668	-	<0.5	0.6
12671	2.4	0.7	<0.5

0,2/8/99

	,		• • •	A	bsorbance	(µAu) (E+0	5)				
	-1.000	-0.500	0.000	0.500	1.000	1.500	2.000	2.500	3.000	3.500	
0				•							
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			Ca	rryover: 0.0	228382	;	:				
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			Bas	seline: -0.00	0989377				:		
		0		IC	V: 4.97736						
1000	Sediment Ammon		`Eice	3: -0.00877:	17Z		<del>-</del>				
D.	14(4(4)2)	عه ۱۰ ا		-	12546 PV	V: 6.34008			Δ - ω - 25 47 DV		
		; '				-	4 12	548 PW: 1	+ω 12547 PV 7.3102	v: 23.1481	
	· •				— ທ່ 1254 <u>9</u>	PW: 7.371	4				·
					12	2550 PW: 9	.28598			;	
150 				18	12551 PW	: 5.91703		:			
0		:	5	→ 0 10591 P	590 PW: 4.4 W: 2.14957	14962	:	•		1 .	
				•	0 10592 PW:	5.71389 <sub>0</sub>	:		; ;		
 الباد						105	593 PW: 1	3.28	:	:	
			230	C 22122	CV: 4.8734	5	:	: :	:	. 1	- ;
2000		·		B: 0.00139 selipe: -0.00	0989377						
O		•			W: 220396	1 1	*				
					12610 F	W: 7.0841			: : 		- 1-
	:			0 - 13613 D	W: 2.38815	126	11 PW: 12	2.855			,
<b>N</b> 3	•				ov. 2.38815 ov. 2.6871				1 •	· · · · · · · · · · · · · · · · · · ·	,
2500		. <b></b> .		1261	4 PW. 3.54	557					- '-
<b>U</b> .				N	38 PW: 3.97	2005 <sub>;</sub>					:
			33	¯12639 PW: 2640 PW: 6	/: 1.62824						:
						V: 6.36847					. :
10			#6	O C	→12641 PV CV: 4.8589	5			:		. 1
3000			) . W	B: -0.00248	1						
			Bas	seliner -0.00	D989377				:	1	
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-						TOLON DIA	: 10.3393				. :
				Ň	12466 PV	<del>42403</del> PVV N: 6.4635					
<u></u>				12671 P	PW: 2.40297	, 		<b></b>	<b>.</b>		
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				seline: -0.00					) U 	, U U U O .	
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Peak Table: ammonia

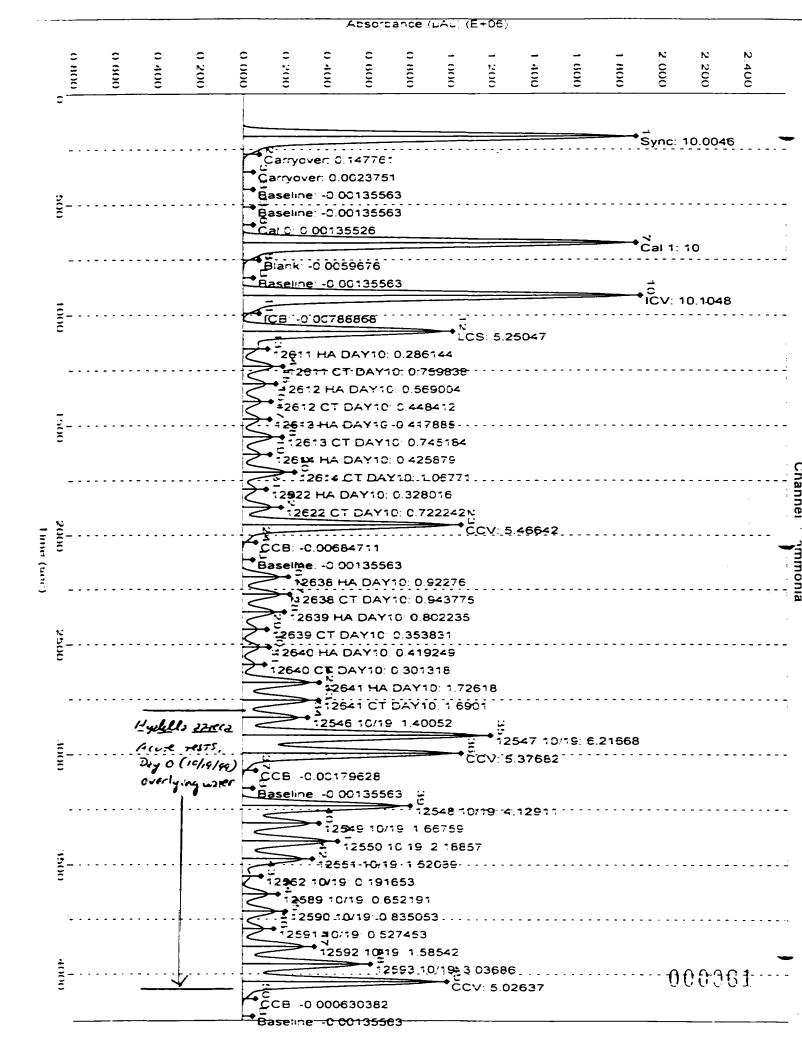
File name: C::FLOW\_4\101299E.RST Date: Obtober 12, 1999 Operator: LKS

Peak	C::p	Name	Type Dil	Wt	Heigh	t Ca	alc. (mg/L)
:	2	Symc	SYNC		1 115	0681	9.935171
2	0	Carryover	CC	<u>-</u>	<u>.</u>	3787	0.022838
3	D.	Carryover	CO	_	1	487	-0.005682
3	Ξ	Baseline	23	:	:	8	-0.009894
Ξ.	D	Baseline	RB	1	1	ε	-0.009894
£	1	Cal 0	RB C C	-	•	2289	0.009893
7	2	Cal 1	ā	-		8182	10.000000
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=	5 A N 5 0	Baseline	23	-	-	0	-0.009894
	•	ICV	•••		1 57	7044	4.977356
	-	103		-		130	-0.008772
	3-	12546 PW		-	7. 73	4716	6.340084
	32	12547 PW	••	-		9467	23.148100
- 3	33	12548 PW	••	-		4003	17.310225
- <del>-</del>	34	12548 PW		-			
- 3				-		4013	7.371138
- =	35	12550 PW	0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0 (0	-		5568	9.285980
	36	12551 PW	-	-		5767	5.917027
- =	37	10590 PW		-		5983	4.449624
19	3.8	10591 PW	Ü	-		9859	2.149575
2:	3.5	10592 PW	<u> </u>	1		2263	5.713890
31	40	10593 PW	•	=		7687	13.279972
22	3	CCV	Ü	-		5021	4.873451
23	=	CCB	Ü	-	<u>-</u>	1306	0.001391
3	5	Baseline	RB	1	1	٥	-0.009894
25	41	10609 PW	÷	-		6151	2.203963
2 5	42	12610 PW	Ü	-		0805	7.084130
2	43	12611 PW	:	-	1 148	8515	12.854989
2 🛢	44	12612 PW	••	1	1 27	7463	2.388149
23	45	12613 PW	••	<u>.</u>	1 31	2054	2.687114
3:	45	12614 PW	:	-	1 41	1381	3.545574
31	47	12638 PW		<u>:</u>	1 46	0495	3.970054
32	48	12639 PW	••	:	1 18	9538	1.628238
33	45	12643 PW	:	<u>:</u>		4455	0.633600
34	50	12641 PW	•	Ξ		8081	6.368472
		CC:	••	-		3344	4.858951
3 S 3 S	3	CC3	•••	=	-	892	-0.002186
3	5	Baseline _	23	-	-	2	-0.009894
3 8	51	10589 PW (D	•••	-	- ::	5331	2.888294
3 5	52	12664 PW 12664	RB 000000000000000000000000000000000000	-		5478	0.210309
40	53	12465 PW 12665		-		7437	10.339272
4: -	54	22456 FW 12666		-		8996	6.463504
<del>-</del>	55	12671 PW		<del>.</del>		9177	2.402970
43	3	225.1 PM	•	-		3863	4.863436
44	<i>-</i>	CCB	•	-	1 25		
3	-	Baseline	RB	-	<del>.</del>	605	-0.004666
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1 Samuel No. Correction Peak Cup Flags J-12/8/99

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10 11 12	3 1 31	LO
13 14 15	32 33 34	
16 17	35 36	
19	38 39	
21 22 23	40 3 1	
B 25 26	0 41 42	BL
27 28 29	43 44 45	
30	46	
	49 50	
35 36	3 1 0	LO BL
38 39	51 52	20
38 39 40 41 42 43 44	53 54 55	
356 36839 412344 42344	3 1 0	TO BT



Peak Table: ammonia

File name: F:\FLOW\_4\102799D.RST Date: October 28, 1999 Operator: LKS 27

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2 0 Carryover CO 1 1 1 27244 0.147761 B 0 Baseline RB 1 1 0 -0.001356 B 0 Baseline RB 1 1 0 -0.001356 6 1 Cal 0 C 1 1 1 495 0.001355 7 2 Cal 1 C 1 1 1 495 0.001355 8 0 Baseline RB 1 1 0 -0.001356 8 0 Baseline RB 1 1 1 0 -0.001356 8 0 Blank U 1 1 1 1827302 10.000000 8 0 Blank U 1 1 1 -843 -0.005968 B 0 Baseline RB 1 1 0 -0.001356 10 2 ICV U 1 1 1 1846458 10.104847 11 1 ICB U 1 1 1 1846458 10.104847 12 3 LCS U 1 1 1 959538 5.250472 13 31 12611 HA DAY10 U 1 1 1 252528 0.286144 14 32 12611 CT DAY10 U 1 1 1 139074 0.759838 15 33 12612 HA DAY10 U 1 1 1 139074 0.759838 15 33 12612 HA DAY10 U 1 1 1 104208 0.569004 16 344 12612 CT DAY10 U 1 1 1 16208 0.569004 16 344 12612 CT DAY10 U 1 1 1 76558 0.417865 18 36 12613 CT DAY10 U 1 1 1 36337 0.745184 19 37 12614 HA DAY10 U 1 1 1 136337 0.745184 19 37 12614 HA DAY10 U 1 1 1 195324 1.067707 21 39 12622 HA DAY10 U 1 1 1 195324 1.067707 21 39 12622 HA DAY10 U 1 1 1 195324 1.067707 21 39 12622 HA DAY10 U 1 1 1 195324 1.067707 22 40 12622 CT DAY10 U 1 1 1 195324 1.067707 23 3 CCV U 1 1 1 19688 0.425879 24 1 1 CCB U 1 1 1 19688 0.922760 25 40 12622 CT DAY10 U 1 1 1 168841 0.922760 26 41 12638 CT DAY10 U 1 1 1 168841 0.922760 27 42 12638 CT DAY10 U 1 1 1 168841 0.922763 31 46 12640 CT DAY10 U 1 1 1 76687 0.49249 31 46 12640 CT DAY10 U 1 1 1 76687 0.49249 31 46 12640 CT DAY10 U 1 1 1 76687 0.49249 31 46 12640 CT DAY10 U 1 1 1 76687 0.49249 31 46 12640 CT DAY10 U 1 1 1 982623 5.376822 34 7 12641 HA DAY10 U 1 1 1 982623 5.376822 35 12557 10/19 U 1 1 1 309039 1.690103 34 49 12546 10/19 U 1 1 1 136070 6.216682 36 3 CCV U 1 1 1 982623 5.376822 37 1 CCB U 1 1 1 982623 5.376822 37 1 CCB U 1 1 1 1 104011 2.188566 42 54 12551 10/19 U 1 1 1 1 304011 2.188566 42 54 12551 10/19 U 1 1 1 304011 1.520886 43 55 12552 10/19 U 1 1 1 35264 0.191653	ak	Cup	Name	Type Dil	Wt		Height	Calc. (mg/L)
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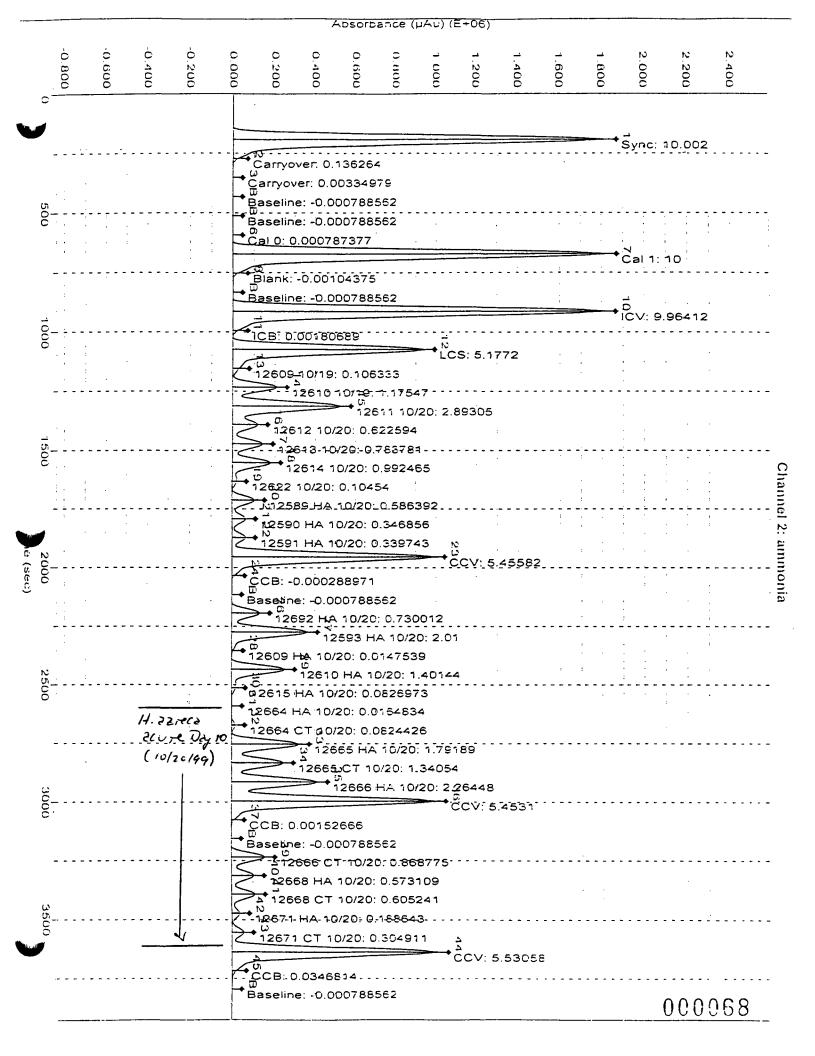
Reak Table: ammonia

File name: O: FLOW\_4\101299F.RST Date: Cotober 12, 1999 Operator: NVW

Fea:	೦ಭರ	Name	Type Dil	Wit	Height	Calc. (mg/L)
-	<b>:</b>	Symo	SYNC 1	-	564454	
Ž	# PTTB O O W P O O O O	Carryover	00 :	_	2027	
3	÷	Carryover	00 1		72	-0.002705
-	-	Baseline		7	8	-0.003327
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É	-	Cal C	3 :	. 1	766	
-	2	Cal 1	2 2	<u>.</u>	1151801	10.000001
:	-	Blank		-	-713	
_	-			-	1	
=	-	Baseline		-	i	-0.003327
	3	ICV ICB 12031 DAY28 12032 DAY28	· · · · · · · · · · · · · · · · · · ·	2	5 <i>6</i> 3210	4.888124
	-	103	· _	-	-185	-0.004933
	£ •	ronar mawga	••	-	3397	
	£2	TECOL DATE		-	3053	
- <b>:</b>	= 2	12032 DR126	-	-		
<u>:                                    </u>	£3	12033 DAY28	-	_	3365	
1.5	£4	12034 DAY28		-	2666	0.019831
٠ <u></u>	£ 3	rongs mivos	••	•	2652	
- <del>-</del>	5.5	12034 DAY28 12034 DAY28 12035 DAY28 10846 DAY0 10847 DAY0 10848 DAY0 10849 DAY0		-		1.139205
-	1	LUGES DAIL	-	-	131553	1.139203
_	ŧ	10547 DAYO	-	-	516340	
1.5	£ 3	10548 DAY0	T	-	393699	3.468033
2:	£ 5	TORKA DIMO		•	187292	1.623291
				-	320812	2.782907
<i>4</i> -	-	2.33. Jmi.		_		
2 4	3	CC3	1	_	563248	
23	-	CC3	· · · · · · · · · · · · · · · · · · ·	<u>-</u>	192	-0.001662
Ξ	-	Baseline 10881 DAYO 10882 DAYO	EE :	-	Ξ	-0.003327
_ 25	-, - <sup>*</sup>	reser bays		-	191736	
4 -			-	-		
2 €	- 4	LUBBY DAIL		<u>-</u>	20094	
<b>2</b> -	73	12664 DAYC	<u> </u>	<u>-</u>	-655	-0.009012
2 =	<u>-                                    </u>	12665 DAYO	· ·	1	390790	3.390665
23	- =	12666 DAYS		-	256086	2.220768
	76		-	-		
<i>:</i> .		12668 DAYO	_	_	24824	0.212270
3 -		12671 DAYO 10589 DAYO 10590 DAYO		-	82076	0.709502
3.2	- 3	10589 DAYO		-	41329	0.355618
::	- =	reser have	- <del></del>	-	58592	0.505543
34	= -		•	-		
	= -	10591 DAYO	• •	-	38378	0.329983
3 5	3		<u>:</u>	-	562789	4.854464
<u>:</u> €	-	CC3		<u>:</u>	775	0.003405
: f :	-	Page Time	33 1	-	•	-0.003327
- 	ē <u>.</u>			-		
	= =		_	-	109196	0.945034
::	£ 2	10593 DAYO	1	-	242593	2.103578
÷:	E 3	10609 DAYO	· ·	-	35412	0.304225
<u>:                                    </u>	E 4	reset bave		-	101344	0.876840
42	ē 5			:		
7.4		1.113 DRIV	-	-	15104	0.127849
43	<del>8 6</del>	letil Dair		-	498576	4.326778
44	€ -	12612 DAY:	-	-	52423	0.712516
4.5	E E	12613 DAYO	•	-	98867	
4.6	8.5	COV CCB Baseline 10892 DAYO 10893 DAYO 10809 DAYO 10818 DAYO 10818 DAYO 12811 DAYO 12812 DAYO 12813 DAYO 12814 DAYO 12822 DAYO		-	141727	1.227565
			-	_	141/2/	
-	9:	-4144 Lai-			22778	
÷ē	3	~ - 1	:	. 1	559331	
÷	-	003	:		188	
3		Baseline	RB : : : : : : : : : : : : : : : : : : :			-0.003327
<u>-</u>	- -			-		
=:	<i>:</i> -	12638 DAYO		. 1	138983	
£2	92	12639 DAYO	<del>-</del>		91032	
3 3	93	12640 DAY0	:		73388	0 634042
	9 4	12641 DAYO		-	306520	
<del>: :</del>	7					

Peak	Cup	Name	Type	Dil	Жt	Height	Calc.	(mg/ī)
55 56 7	<u> 1</u>	CCB	U U RB	1		, 55		4.859718 0.003492 -0.003327

	0	Baseline
Peak	QuD	Flags
- (	30001	BT PO TO
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3 25 26	0 71 72	31,
27 28 29 33 33 34 56	73456789033	TO .
3 567890123456 890123456 44444444444444444444444444444444444	300001200811223456785081101234567890310120120145678903101 77777778 888888889 9	3 <u>7</u>
60 0) 4 (B) 13	1 0 91	ET TO



Peak Table: ammonia

File name: E: FLCW\_40102099E.RST Date: October 28, 1999 Operator: LKS

Peak	Cup	Name	Type Dil	Wt		Height	Calc. (mg/L)
:	2	Symo	SMC	:	1	1827617	10.001991
-	# 11 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Carryover	CC CC	•	7	25041	0.136264
	-	Carryover	22	<i>-</i>	-	756	0.003350
-	-	Baseline	RB	-	-	, 35	-0.000789
<i>=</i>	-		7.3	<del>-</del>	-	<u> </u>	
=	Ü	Baseline	R3	-	_	3	-0.000789
ŧ	-	Cal 3	C C T RB	-	-	288	
-	2	Cal 1	2	<u>-</u>	2	1827253	10.00001
£	2	Blank		-	-	-47	-0.301044
8	2		23	<u>.</u>	•	2	-0.000789
	2	Baseline 10: 108 108 12609 10/19 12610 10/19 12611 10/20 12612 10/20	••	-	-	1820698	9.964125
				-	-	474	0.001807
<del></del>	-		- 	-	-		
<u></u>		3	•	-	-	946075	5.177200
13	ŧΞ	12609 10/19	Ţ	<u>:</u>	_	19572	0.106333
: ÷	€ 2	12610 10/19		<u>:</u>	_	214916	1.175473
15	€3	12811 10/20		<u>-</u>	-	528736	2.893049
٠ ۽	64	12612 10/20	••	•	-	113899	0.622594
- <del>-</del>	£ 5	12613 10/20		-	-	143349	0.783781
	£ 6	12614 10/20		-	-	181478	0.992465
	- <del>-</del>	12514 11/20	-	<del>-</del>	_	19245	
	67	12622 15/25	-	_	_		0.104540
2 [	€ €	12589 HA 10/20	Ü	-	_	107284	0.586392
2 <u>-</u>	69 70	12590 HA 10/20	::	<u>-</u>	<u> </u>	63518	0.346856
22	7.0	12891 HA 10/20	<u>;</u>	<u>:</u>	-	£2219	0.339743
23	3	c <del>c:</del>	:	_	_	996983	5.455823
2÷	-	CC3	<del></del>	-	-	91	-0.000289
= .	-	Baseline	23	-	=	7-	-0.000769
3 2 <del>6</del>	- <del>-</del> -	12692 HA 10/20	•••	<del>-</del>	-	133525	0.730012
2 t				-	-		
2-	· <b>4</b>	12593 HA 10/20	-	<del>-</del>	-	3 £ 7 3 9 2	2.009997
2 5	-3	12609 HA 10/20	Ţ	-	_	2840	0.014754
25	- 4	12610 HA 10/20		<u>-</u>	_	256203	1.401440
3:	-5 -6	12615 HA 10/20		-	-	15254	0.082697
3:	- £	12664 HA 10/20	:-	•	-	3156	0.016483
32		12664 CT 10/20	••	•	-	15207	0.082443
33	78	12665 HA 10/20	•	-	-	327542	1.791890
	7 5	12665 CT 10'20		<del>-</del>	-		
: <del>-</del>			. <u>.</u>	-	-	245075	1.340539
3 5	£ 0	12666 HA 10,20	Ţ	<u>-</u>	_	413889	2.264477
3 €	3	CC:	:	<u>-</u>	-	996484	
37	-	0.03	-	<u>.</u>	-	423	0.001527
Ξ	-	Baseline	23	<u>.</u>	-	3	-0.000789
7.2	<u>.</u>	12666 CT 10/20		-		155879	
÷:	3 <u>-</u> 3 2	12668 HA 10/20		-	-	104857	0.573109
- ·	5.2	- 12000 ALR 10/20	;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;		-	111728	0.373103
4:	83	12668 07 10,20	- 	<del>.</del>	_		
÷ 2	£ <b>4</b>	12671 HA 10/21	<u>.</u>	-	-	34611	0.188643
43	8.5	12671 CT 10/20		<u>.</u>	-	53855	0.304911
<u>:                                    </u>	3	cc:	÷	<u>.</u>	-	53855 1010641	5.530580
4 5	•	CCE	Ü	<u>•</u>	-	6481	0.034681
3	=	Baselime	RB	-			
-	-		•••	-	-	_	0.000709

Peak	Cup	Flags
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Peak	Cab	Flags
الله مر الله م	J 0 0	BD
- MB	2002131234567 666666	LO BL
20 21 22 23 24 36 77 39 30 30 30 30 30 30 30 30 30 30 30 30 30	00120021312345678903101234567890310	ĽO BĽ
3 3 3 3 3 3 3 4 4 4 4 4 5 B	78 79 0 3 1 0 1 2 3 4 5 3 1 0 8 8 8 8 8 8	BL
44 45 B	3 1 0	BL

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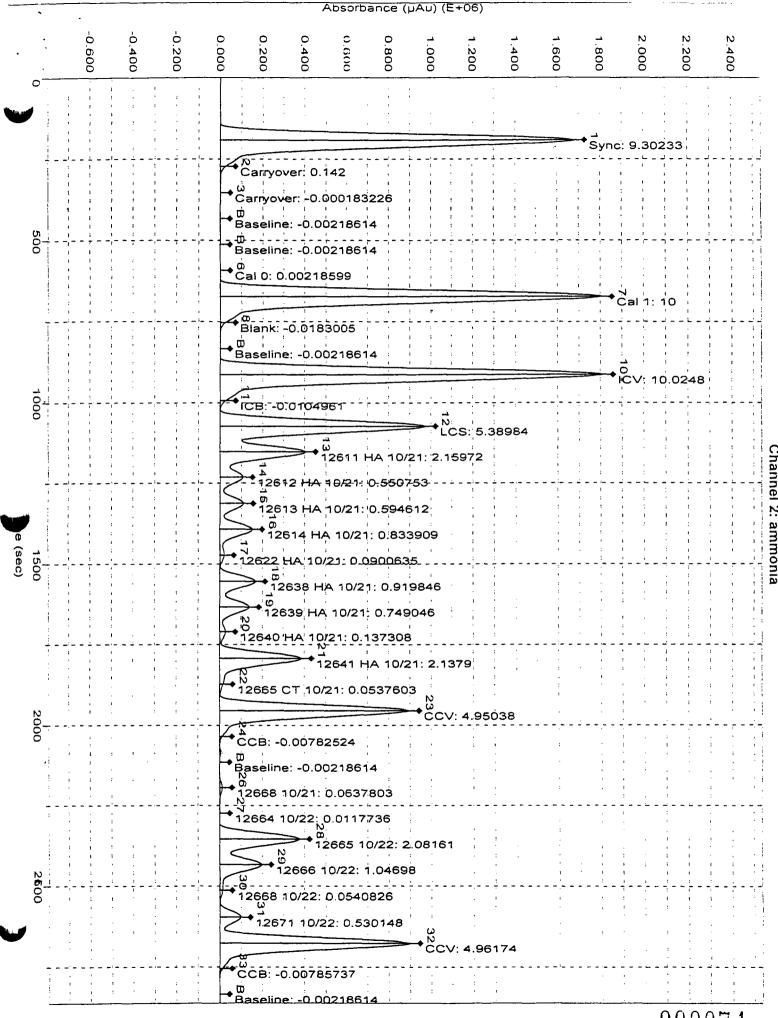
Peak Table: ammonia

File name: E:\FLOW\_4\112399A.RST Date: November 23, 1999 Operator: LKS

ak	Cup	Name	Type Dil	Wt	H	leight	Calc. (mg/L)
1	2	Sync	SYNC	1	1	1064292	9.994657
2	0	Carryover	CO	1	1	4045	0.037861
3	0	Carryover	CO	1	1	430	0.003921
В	0	Baseline	RB	1	1	0	-0.000122
В	0	Baseline	RB	1	1	0	-0.000122
6	1	Cal 0	С	1	1	26	0.000121
7	2	Cal 1	С	1	1	1064860	10.000000
8	0	Blank	Ŭ	1	1	-272	-0.002680
В	0	Baseline	RB	1	1	0	-0.000122
10	2	ICV	Ū	1	ī	1075499	10.099907
11	ī	ICB	Ū	ī	ĺ	-261	-0.002569
12	3	LCS	Ŭ	1	ĺ	566267	5.317698
13	31	12546 HA 10/29	Ü			11316	
14	32	12547 ha 10/29		1	1		0.106144
			Ŭ	1	1	266707	2.504527
15	33	12548 HA 10/29	Ŭ	1	1	48514	0.455477
16	34	12549 HA 10/29	U	1	1	69075	0.648565
17	35	12550 HA 10/29	U	1	l	98481	0.924715
18	36	12551 HA 10/29	U	1	1	98974	0.929342
19	37	12552 HA 10/29	U	1	<u>1</u>	45482	0.426997
20	38	12589 HA 10/29	U	1	1	78912	0.740938
21	39	12590 HA 10/29	U	1	1	47610	0.446985
22	40	12591 HA 10/29	U	1	1	46955	0.440836
23	3	ccv	Ū	1	1	572454	5.375807
	1	CCB	Ū	ī	ī	362	0.003273
	ō	Baseline	RB	1	ī	0	-0.000122
26	41	12592 HA 10/29	U	1	i	73488	0.690005
27	42	12593 HA 10/29	U			48673	
				1	1		0.456970
28	43	12609 HA 10/29	U	1	1	27546	0.258559
29	44	12610 HA 10/29	Ŭ 	1	1	36409	0.341793
30	45	12611 HA 10/31	U	1	1	35915	0.337153
31	46	12612 HA 10/31	Ŭ	1	1	20836	0.195546
32	47	12613 HA 10/31	U	1	<u>1</u>	77622	0.728827
33	48	12614 HA 10/31	U	1	1	20717	0.194428
34	49	12622 HA 10/31	Ū	1	1	45410	0.426320
35	50	12638 HA 10/31	U	1	1	49857	0.468082
36	3	ccv	U	1	1	575546	5.404839
37	1	CCB	Ū	1	ı	-315	-0.003079
В	0	Baseline	RB	ı	1	0	-0.000122
39	51	12639 HA 10/31	Ŭ	ī	1	80162	0.752680
40	52	12640 HA 10/31	บี	ī	ī	27255	0.255831
41	53	12641 HA 10/31	Ū	1	1	121018	1.136359
42		12546 HA 11/2				5056	
	54		U	1	1		0.047356
43	55	12547 HA 11/2	U	1	1	159373	1.496553
44	56	12548 HA 11/2	Ŭ	1	1	11375	0.106706
45	57	12549 HA 11/2	Ŭ	1	1	5284	0.049505
46	58	12550 HA 11/2	U	1	1	5509	0.051615
47	59	12551 HA 11/2	U	1	1	11910	0.111724
48	60	12552 HA 11/2	Ŭ	1 .	1	5090	0.047677
1 Q	3	CCV	U	1	1	584054	5.484735
	ı	CCB	Ū	1	ī	-15	-0.000261
В	Ō	Baseline	RB	ī	ī	0	-0.000122
52	61	12589 HA 11/3	U	1	1	31152	0.292423
53	62	12509 HA 11/3	Ŭ	1	1	7090	
در	63	12590 HA 11/3	Ū	1	1	4609	0.066463 0.043165
54		1/391 84 11/3	1.1	1		45014	0 044165

Peak	Cup	Name	Type Dil	Wt	Height	Calc. (mg/L)
5.5	64	12592 HA 11/3	:	:	7380	0.069180
5.6	65	12593 HA 11/3	•	- :	3509	0.032834
57	66	12609 HA 11/3	••		93219	0.875302
5.8	67	12610 HA 11/3	:		24751	0.232311
59	€8	12611 CT 11/3	:	:	27450	0.257665
€Đ	69	12612 CT 11/3	<del></del>	1	16613	0.155894
51	75	12613 CT 11/3	÷	1 :	8835	0.082848
52	3	CCV	::	1	578290	5.430609
63	1	CCB	÷	:	196	0.001721
5	0	Baseline	R3	1	. 0	-0.000122

Peak	Cup	Flags
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Peak Table: ammonia

File name: F:\FLOW\_4\102799F.RST Date: October 28, 1999 Operator: NVW

Peak	Cup	Name	Type Dil		Wt	Height	Calc. (mg/L)
	2	Symo	SYNC	-	יַר	1683774	9.302330
Ž	_ D	Carryover		-	1	26092	0.142000
	<u>ت</u> د	Carryover	CC CC		-	362	-0.000183
(1) (I) (I)	2	Baseline	RB	-	<u>.                                     </u>	0	-0.002186
5	ō	Baseline	RB	-	_ 1	ō	-0.002186
4	•	Cal 0		-	-	791	0.002186
7	2	Cal 1	C C U RB	=	7	1810026	10.000000
£	Ŧ.	Blank		-		-2916	-0.018301
5	ř	Baseline	22	-	- 1	C C	-0.002186
8 B C	2	ICV		-	1	1814510	10.024775
	-	ICB	••	-	-	-1504	-0.010496
12	-	LCS	••	-	•	975757	5.389835
13	4	12611 HA 10/21	<del>.</del> .	-	= = = = = = = = = = = = = = = = = = = =	391225	2.159720
	92	12612 HA 10/21		-	7	100062	0.550753
15	93	12613 HA 10/21	••	=		107998	0.594612
• =	54	12614 HA 10/21		-	-	151302	0.833909
<del></del>	95	12622 HA 10/21		-	7	16694	0.090064
- 18	5 €	12638 HA 10/21		-		166854	0.919846
19	97	12639 HA 10/21	-	-	-	135945	0.749046
25	98	12640 HA 10/21		-	=	25243	0.137308
5-	99	12641 HA 10/21		-	-	367277	2.137903
22	100	12665 CT 10/21	-	Ξ	ī	10124	0.053760
23	3	CCV		-	Ξ	896232	4.950380
24	:	CC3	:	-	Ī	-1020	-0.007825
	2	Baseline	<b>RB</b>	Ξ	Ī	9	-0.002186
3 26	101	12668 10/21	••	-		31937	0.063780
27	102	12664 10/22	•	-	ī	2526	0.011774
28	103	12565 10/22	-	-	1	377090	2.081606
25	104	12666 10/22	••	-	1	189860	1.046979
3.0	105	12668 10/22		-		10183	0.054083
31	106	12671 10/22	••	-	-	96333	0.530148
32	3	ccv.	••	-	3	898288	4.961744
33	1	CCB	••	-	<u> </u>	-1026	-0.007857
3	3	Baseline	7.3	-	1	٥	-0.002186

Peak	ರ್ವರ	Flags
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Peak	Cup	Flags
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24	1	LO
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28	103	
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15	12639 C		
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NVW 20.5 ppms <0.5 ppins 593 PW 10609 PW 611 PW 13, 613 PW 640 PW 641 PW 17. w 17666 PW 17666 PW N

	ABS	NUW	JWW
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	-	10/12/99	المالية ال
···			

CI	ient: Menzie-Cura & Assoc. Project: 99033	BTR: 3615
Da	ate sediments distributed to test chambers (100 mL h	omogenized sediment):
•	ate sediments distributed to test chambers (100 mL h <i>H. azteca</i> acute test: 10/6/99 / ١٥/١٤/٩٩; ALL SA.	MPLES JG - Acure reresis.
•	C. tentans acute test: 10/6/99	1. (
•	H. azteca chronic test: 10/18/99; ALL SAMPLES JO	s for LS
•	H. azteca chronic test: 10/18/99; ALL SAMPLES JO C. tentans chronic test: 10548, 12550, 12551; 10	18/99 JG for LS

10/28/29 - Lozden sodinents for exmeles (12548,12550, 12551, 12552,

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
12546	6.9			Viscous mud, NO Overlying water
12547	7.0			Liquid, fine mud, many freshwater  odstropoids  removed visible gastropoids
12548				
12546	7-0			Liquid mud, gastropads present, removed Those visible 10/6 Th
12549	7.0			Soft mud, pine needles, some overlying water
12550	7.0			Soft mud with overlying water fine need les
12551	7.0			Soft mud with overlying water
12552 LCS	miciolag			EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.
	1	1	1	1

Reviewer: Date: 12/7/97
Laboratory: Agoatec Biological Sciences, South Burlington, Vermont

000030

С	lient: Menzie	Cura & Ass	oc. Pro	ject: 9903	BTR: 3622 / 3629
D				-	100 mL homogenized sediment):
•	H. azteca ac			18/99 JE	- TM
•	C. tentans a		10/7/99		
•	H. azteca ch C. tentans c	ronic test: hronic test:	10/18/9	9 : 185	92,12593,12609 TM Sieved to remove
			<del></del>	<del>-                                    </del>	14/2 146/41/2 - CACIONIA
-	<u> </u>				(for C.t. onl
:	Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
+	12589			<del></del>	
_		7.1		<u> </u>	chrown much seawant with sticks a
	12590	6,9		ائي .	chrown mudde sediment with sticks as
-	12591	69			brown mud with ver material
-	<b>¥</b> 12592	7.1			ak mous mus with little veg mote
-	12593	7.0			biack watery mus w/petrolium-like odo
:	12609	7.1			thick sk. brown oshesive musi with
-	12610	12			ak brown very Thick colesing materia
÷		1.		<u> </u>	W/some very
-					materia
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-	<del></del>	<del>-i i</del>		·	
-	12615			<del></del>	EPA anificial control sediment (77% med. and fine sand;
	LCS				17% kaplinite clay: 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.
_		ct porewater		, san	d pH, decant and preserve sulfide and ammonia nples.

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Client: Menzie-Cura	& Assoc.	Project:	99033	BTR:	3629 / 3633

Pate sediments distributed to test chambers (100 mL homogenized sediment):

H. azteca acute test: 10/8/99
 C. tentans acute test: 10/8/99

*H. azteca* chronic test:*C. tentans* chronic test:

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
12611	6.8			black mud w/leaf litter
12612	7.7			Fine Brown mud
12613	7.7			Soft Brawn mud
12614	7.5			Soft Brown mud
12638	7.6			Soft Brown mud
12639	7.3			sticks + leaves on top + through out conesive mud, dark
12640	7.2			Sticks + leaf litter Dark thick mud
12641	72			SOFT Brown mud
12622				EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3).
LCS				Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia  $\dot{}$ 

Entered by: 11C Date: 10/8/99

Reviewer: \_\_\_\_\_\_ Date: \_\_\_\_\_\_.
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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<u> </u>			
Client: Menzie-Cura & Assoc.	Project: 99033	BTR: 3641	

Date sediments distributed to test chambers (100 mL homogenized sediment):

- H. azteca acute test: 10/9/99C. tentans acute test: 10/9/99
- H. azteca chronic test:C. tentans chronic test:

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
12664	7.8			fine Cohesire mad.
· •				
12665	7.3			tine soft mud
	_	:		
12666	7.5			First. Sticky / Cohesive mud
!		:		:
-12667-JG 12671	7.4	·		fine; brown mud - chironomides
	:			
:	! 			
12668				EPA artificial control sediment (77% med, and fine san 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3
LCS				Stored dry, then hydrated prior to addition to test chamber

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by: 3 Date: 15/9/99

Reviewer Date 12/8/99
Laboratory Aquated Biological Sciences, South Burlington Vermont

hasurvwt doc

## Preparation of Formulated Control Sediment for Freshwater Sediment Toxicity Tests

Procedure based on EPA/600/R-94/024

Batch No. 10/4 Preparation Date: 10/4/99 Prepared by: 116.

Ingredient	Amount (g)	Percent composition
Fine sand	1848	
Medium sand	924	77
Kaolinite clay	612	17
Blended and 0.3 mm sieved		
Canadian sphagnum peat	180	5
CaCO3	36	1
Total	3600	100

Store well-mixed and dry in a sealed Rubbermaid box. Label by batch number. Store copy of this documentation in project file. Store original in Sed/Water preparation notebook.

Hydrate to a cohesive sediment consistency before use.

## \_ DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

#### Week of October 3, 1999

ACTIVITY / DAY	; Sun	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
			<del>!</del> —	<u>;                                    </u>	<u></u>		<u></u>
Prior to noon fill reservoir (1L)	s'V		/			V	
Noon delivery cycle		· · · · · · · · · · · · · · · · · · ·					·····
solitier boxes filling?			/	<b>t</b>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<b>√</b> _	
syringes filling?		: 🗸	<u></u>				
needes flowing?	1/	! /			· /	U.	
• beaker screens clear, flowing?			: /	V		· //	
• oranage to waste oil?		<b>/</b> ,		<b>/</b>	7,	V	
• empty waste buckets?			V		V	V	
Test monitoring							
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Reviewer \_\_\_\_\_\_ Date \_\_\_\_\_ (248)49 Laboratory, Aquateo Biological Sciences, South Burlington, Vermont

### DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

Week of October 10, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	
Prior to noon fill reservoirs (1L)	~		V	\ <u></u>		<b>/</b>	V	
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• syringes filling?	\_/	V	V		V	/	/	
• needles flowing?		1	V	V.	V	/	/	
• beaker screens clear, flowing?			V.	1	1	/	V	
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empty waste buckets?	11		./					
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Test monitoring		,			,			
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• D.O. pk?			1/	1/1	(R3) /		V	
check for floating organisms	¥1) (1×			V		1	1./_	
• feeding completed?			V	V	V	1/		
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Additional activities			_	,		,		
Prior to midnight fill reservoirs (1L)		1/2		1./		1/	V	
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ests are in progress. Corrective action must be taken whenever appropriate. Document corrective								

<u>Procedure</u>: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

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K1)	12 591 Vall reps	had floaters	10/10 Tm	Squirted Them
	down most s	peined to be	living	
(xid)	7 1	id floorers ic		

3) 12666 Ha and (+. got an extra monval renewal 13/14 Jun pm

Reviewer Date /2/8/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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### DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

Week of October 17, 1999

ACTIVITY / DAY							
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Prior to noon fill reservoirs		: <u>/</u>					/
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Expersive with the test data backage.

Experie was for H.2. change = Line / Recor Mose = Recon Water Secondary

Reviewer \_\_\_\_\_\_ Date 1.2/8/99
Laboratory Adulates Biological Sciences South Burlington Vermont

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## DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

#### Week of October 24, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)		/	V			V	
Noon delivery cycle							
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• syringes filling?		1		1		V	
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test temperature ok?		V	l V	V	V		1
• D.O. ok?		1/		\ <u>/</u>	V/_	V	
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Additional activities		_				_	
Prior to midnight fill reservoirs (1L)				IV.	1	11/	
Check sediment water supply					<b>\</b>		
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Corrective Action / Comments							
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Reviewer \_\_\_\_\_ Date 12 | 8/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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### DAILY CHECKLIST FOR AUTOMATED DELIVERY SEDIMENT TOXICITY TESTS

Week of October 31, 1999

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ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat
50.000	<del>/</del>	<u>,                                     </u>				- 7.	
Prior to noon fill reservoirs (1L)	<u> </u>		<u> </u>	$\checkmark$	V	$\checkmark$	
Noon delivery cycle							
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* synnges filling?		/	· /	<u> </u>			
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check for floating organisms				/ /	V		//
• feeding completed?	V	V	1/	$\overline{}$		<b>V</b>	V
Additional activities			j				
Prior to midnight fill reservoirs (11)		$\sqrt{}$		V	1		
Check sediment water supply	V	· V					-
Corrective Action / Comments						· • • • • • • • • • • • • • • • • • • •	
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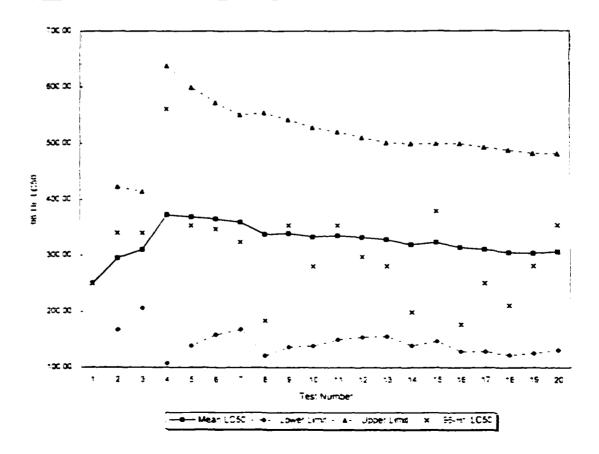
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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont



## Reference Toxicant Control Chart Hyalella azteca in Potassium chloride (mg/L)

		Organism					· · · · · · · · · · · · · · · · · · ·
Test	Test	Age	96-Hr.	Mean	Lower	Upper	Organism
Number	Date	(Days)	LC50	LC50	Limit	Limit	Source
· n	12/20/97	:0	250 000	250 00			Env. Consult & Testing
2	04/15/98	5	340,198	295 10	157.54	422.66	Env. Consult & Testing
3	04:17/98	13	340 198	310.13	20 <del>5</del> 98	414.28	Env. Consult & Testing
4	08/04/98	-4	561 231	372 91	107 80	63E 02	Env. Consult & Testing
5	05/22/98	•:	353,553	369 04	138 79	599.28	Env. Consult & Testing
£	09/13/98	• •	347 163	365 39	158 58	572 10	Env. Consut & Testing
-	1072578	•2	324 210	359 5*	168 26	550 76	Env. Consult & Testing
٤	11113/98	•:	183 717	337 53	-21.20	553 87	Env. Consult & Testing
ş	02/19/99	ş	353 <i>5</i> 53	339 31	136 67	541.95	Env. Consult & Testing
•3	05/13/99	8	280,615	333 44	13E E1	52E 07	Env. Consult & Testing
••	06/21/99	•2	353 553	335 27	150 23	520.31	Env. Consult & Testing
•2	06/25/99	*4	297 302	332 **	154 32	509 89	Env. Consult & Testing
•3	062699	13	250 616	328 15	- 55 55	500.74	Env. Consult & Testing
-4	07/02/99	-	198 425	318 88	.35 .7	498 £2	Emil Consult & Testing
•5	07/07/99	ŧ	376 929	322 55	145 93	49E B4	Env. Consult & Testing
•=	07/07/99	-	-76 7	313 -5	12E 73	498 77	Aquatic Research Organism
- 7	09/13/99	••	250 000	310 00	28.21	491.80	Aduatic Research Organism
- 5	10/08/99	9	210,224	304 45	.21 93	456 99	Aduatic Research Organism
•\$	1073/99	13	280 616	303 20	125.48	480 93	Aquano Research Organism
20	10.73/99	9	353 553	305 72	131.28	4BC 17	Aquatic Research Organism



## Hyalella azteca Chronic Survival, Growth and Reproduction Toxicity Tests Conducted on Sediment Samples from the Solutia Site, Sauget, Illinois

Reference BTRs 3615, 3622, 3629, 3633, 3641, 3643

Prepared for:
Menzie-Cura & Associates
1 Courthouse Lane, Suite 2
Chelmsford, MA 01824



Prepared by: **Aquatec Biological Sciences**75 Green Mountain Drive
South Burlington, Vermont



## **Aquatec Biological Sciences**









BTRS 3615, 3622, 3629, 3633, 3641, 3643

PROJECT: 99033

I have reviewed this data package, which was completed under my supervision. This data package is complete, and to the best of my ability, accurately reflects the conditions and the results of the reported tests.

John W. Williams

Toxicity Laboratory Manager

/2 / 23/99 Date

I have reviewed and discussed this data package with the responsible laboratory manager. Based on this review, the data package was, to the best of my knowledge and belief, conducted in accordance with established company quality assurance procedures.

Philip C. Downey, Ph.D.

Director

12/3/199 Date

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QUALITY ASSURANCE	5

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APPENDIX B:	CHAIN-OF-CUSTODY DOCUMENTATION
APPENDIX C:	LABORATORY DOCUMENTATION AND DATA ANALYSES FOR Hyalella azteca TOXICITY TESTS
APPENDIX D:	RESULTS OF STANDARD REFERENCE TOXICANT TESTS

#### **EXECUTIVE SUMMARY**

# 100.1HA Amphipod, Hyalella azteca, 42-day Chronic Survival, Growth, and Reproduction Test Conducted October 19 - December 3, 1999 for Menzie-Cura & Associates Solutia Site, Sauget Illinois

Lab Test ID	Sample ID	Day 28 Mean Survival (%)	Day 28 Mean Dry Weight (mg)	Day 35 Mean Survival (%)	Day 42 Mean Survival (%)	Day 42 Mean Dry Weight (mg)	Day 42 Mean Number of Neonates/ Female
12546	BTOX-C-1	93	0.766	92	87	0.510	11.5
12547	BTOX-C-2	88	0.456	76	73	0.489	3.7
12548	BTOX-C-3	90	0.656	80	76	0.402	3.3
12549	BTOX-D-1	89	0.571	85	84	0.414	5.1
12550	BTOX-D-2	87	0.684	85	81	0.428	4.0
12551	BTOX-D-3	80	0.731	79	79	0.400	3.5
12552	Laboratory Control	55	0.982	51	46	0.231	0.6
12589	BTOX-B-1	23*		8*	8*		
12590	BTOX-B-1 (Dup)	22*		26*	26*		
12591	BTOX-B-2	Acute	Toxicity		-		
12592	BTOX-B-3	49*		40*	39*	-	
12593	BTOX-B-M	88	0.481	89	85	0.348	1.6
12609	E-1 Dead Creek	72 <b>°</b>		63*	56*		
12610	E-2 Dead Creek	97	0.612	94	91	0.462	4.6
12611	E-3 Dead Creek	67*		53	50°		
12612	<b>BP-1 Borrow Pit</b>	93	0.594	88	83	0.380	4.1
12613	BP-1 (Dup) Borrow Pit	89	0.636	80	75	0.423	4.2
12614	<b>BP-3 Borrow Pit</b>	95	0.470	86	84	0.322	5.3
12615	Laboratory Control	62	0.296	36	33	0.299	1.8
12622	Laboratory Control	55	0.501	38	35	0.377	4.0
12638	BP-2 Borrow Pit	82	0.563	74	73	0.390	4.3
12639	F1 Dead Creek	91	0.639	89	84	0.397	4.8
12640	F2 Dead Creek	90	0.554	74	70	0.447	3.8
12641	F3 Dead Creek	89	0.661	85	76	0.406	4.8
12664	Prairie DuPont	90	0.443	83	79	0.346	2.6
12665	Praire Dupont 2	89	0.648	85	80	0.498	6.2
12666	Reference Creek	70°		64	65	0.459	2.3
12668	<b>Laboratory</b> Control	73	0.477	65	59	0.293	2.2
12671	Ref 2-2 Ref Borrow Pit	87	0.458	85	83	0.351	3.4

<sup>\*</sup> A statistically significant reduction in the response was observed (relative to a corresponding Reference Site response. P<0.05):

<sup>--</sup> When a significant reduction in survival on Days 28 or 42 was detected, mean dry weight and reproduction data were only reported in Appendix A (See Results)

#### **INTRODUCTION:**

Samples were received for toxicity testing at Aquatec Biological Sciences of 75 Green Mountain Drive, South Burlington, Vermont. The results of the following tests are reported:

Client:

Menzie-Cura & Associates

Facility/Location:

Dead Creek / Sauget, Illinois October 4 - October 9, 1999

Initial Sampling Date: Testing Dates:

October 19 - December 3, 1999

Tests Conducted:

Amphipod, Hyalella azteca, Chronic 42-day

Survival, Growth, and Reproduction

#### METHODS:

#### **Toxicity Tests**

The procedures followed in conducting these toxicity tests were based on <u>draft</u> methods described by the USEPA (EPA 600/R-98/XXX [new number pending]). Test conditions for *Hyalella azteca* are listed in Table 1. Testing was completed in four separate groupings based upon chronological sequencing from the time of sediment collection. The objective for the test groupings was to complete the 10-day acute tests prior to expiration of a project-specific 14-day sediment storage time so that subsequent chronic toxicity tests could be started within a 14-day time frame. The acute toxicity results were reported separately (Aquatec Biological Sciences, December 1999).

Sediments were loaded into beakers for chronic testing within one day after completion of the acute toxicity tests, therefore, the objective of starting all tests within 14-days from the time of collection was accomplished for all samples. Chronic toxicity testing with *Hyalella azteca* was initiated for all samples received because some acute toxicity retests were also being started concurrently. Chronic toxicity testing for the first testing group was initiated on October 19, 1999. The second testing group was initiated on October 20, 1999. The third testing group was initiated on October 21, 1999. The fourth testing group was initiated on October 22, 1999. After the conclusion of the acute retests, chronic testing of Sample 12591 was suspended on Day 16 because acute toxicity was confirmed and then verified by examination of several replicates from the chronic test replicates.

A laboratory control (artificial sediment) was included with each testing group. Amphipods, seven days old, obtained from Aquatic Research Organisms were used for chronic toxicity tests.

Test organisms were exposed for 28 days to sediment samples. On Day 28, surviving amphipods were assessed for survival (all replicates) and growth (by dry weight, four replicates). Organisms from eight replicates were shifted to water only exposure for subsequent survival, growth, and reproduction (neonate production) assessment.

Chronic toxicity tests were ended on Day 42. Overlying water was renewed either automatically or manually. For those samples/replicates renewed automatically, the renewal cycle was programmed for midnight and noon of each day. For samples/replicates renewed manually, the renewal cycle was performed at approximately 7:00 a.m. and 7:00 p.m. daily. Documentation of renewals and renewal system checks is located in Appendix C. At the conclusion of the sediment exposure any additional amphipods recovered during Quality Assurance repicks were included in the Day 28 replicate survival assessment, but were not included in the replicate growth assessment.

#### Sediment Preparation

The samples were stored refrigerated and in the dark whenever they were not being used in preparation for testing. Sediments distributed in test beakers were examined for the presence of indigenous organisms that were removed when observed. Also, large pieces of vegetative material (e.g., leaf litter, sticks, grass) were removed if observed. Qualitative observations regarding the sediment type and indigenous organisms removed were recorded. The laboratory control sediment (artificial sediment) was prepared following formulations specified in the USEPA protocols and then hydrated prior to distribution to test chambers. Sediments were then distributed to individual replicate test chambers, overlying water was added, and the overlying water renewal system was activated. The unused portion of each sample (in the original sample container) was returned to refrigerated storage.

#### Statistical Analyses

Laboratory Control survival was variable and generally below the 28-day <u>draft</u> protocol target limits (This variability may reflect limitations of the USEPA recommended sediment formulation for adequately supporting *Hyalella azteca* survival and growth over extended periods of time.). Statistical comparisons were made against appropriate reference sites since this evaluation would provide more relevant biological comparisons.

Survival of the original amphipods and production of neonates was evaluated on Days 35 and 42. On the Day 35 assessment, the number of original amphipods were counted (alive) in the test beakers while the neonates were removed for enumeration. On Day 42 the original amphipods were removed and weighed, while the additional neonates produced were enumerated. Occasionally, the number of original amphipods counted on Day 35 was lower than those counted on Day 42, due in a large part to underestimation of Day 35 original amphipods associated with the variability of counting live swimming organisms. Statistical analysis of the Day 35 survival data was conducted on the observed counts.

Test data were evaluated for normality and equality of variance and the grouped data (See Results for statistical groupings.) were tested by appropriate parametric or non-parametric multiple comparison statistical tests to identify significant reductions in the response relative to the site-specific reference sample. Proportion surviving data were transformed (Arcsin square-root) before analysis. Statistical significance for any sample was based upon the most sensitive endpoint observed.

#### **PROTOCOL DEVIATIONS:**

Several test replicates were excluded from the data tabulations and statistical analysis because of apparent discrepancies in the number of test organisms allocated to these replicates. The affected test replicates included: Samples 12546 (Replicates C and D); 12551 (Replicate C); 12590 (Replicate K); and, 12610 (Replicate E).

Sample 12550, Replicate F apparently had an initial allocation of eleven amphipods rather then

Sample 12593 exhibited *Hyalella azteca* acute toxicity in the retest series. Replicate L of the *Hyalella azteca* chronic test for this sample was examined on Day 15. Surviving amphipods were recovered in this replicate, therefore the chronic toxicity test was continued. Replicate L was removed from the testing system and excluded from the analysis of chronic data.

Some minor recording discrepancies in the number of amphipods surviving versus the number of amphipods weighed occurred: 12662 Replicate K (Day 28 seven surviving, six weighed); 12638 Replicate C (Day 42 nine surviving, eight weighed); 12640 Replicate C (Day 42 five surviving, six weighed); 12640 Replicate H (Day 42 seven surviving, eight weighed); and, 13641 D (Day 42 seven surviving, nine weighed). Data were tabulated and statistical analyses were performed using the recorded data.

#### **RESULTS:**

Summary result tabulations for the *Hyalella azteca* whole sediment toxicity tests are located in Appendix A.

Statistical Group 1 Results (Lotic, creek habitat): The combined responses for samples 12664 (Prairie DuPont) and 12665 (Prairie Dupont 2) were used as reference site data for statistical comparisons. Two computer runs were conducted due to limitations associated with the statistical software (A limited number of samples can be analyzed concurrently).

The first computer run included samples 12549 (BTOX-D-1). 12550 (BTOX-D-2), 12551(BTOX-D-3), 12609 (E-1 Dead Creek). 12610 (E-2 Dead Creek). 12611 (E-3 Dead Creek). 12639 (F-1 Dead Creek). 12640 (F2 Dead Creek). and 12641 (F3 Dead Creek). Sample 12609 exhibited statistically significant reductions in mean survival on Days 28, 35, and 42. Sample 12611 exhibited statistically significant reductions in mean survival on Days 28 and 42.

This second computer run of statistical analyses included samples 12546 (BTOX-C-1), 12547 (BTOX-C-2), 12548 (BTOX-C-3), 12589 (BTOX-B-1), 12590 (BTOX-B-1 Dup), 12592 (BTOX-B-1), 12590 (BTOX-B-1 Dup), 12592 (BTOX-B-1), 12590 (BTOX-B-1 Dup), 12592 (BTOX-B-1 Dup), 12

3), 12593 (BTOX-B-M), and 12666 (Reference Creek). Samples 12589, 12590, and 12592 exhibited statistically significant reductions in mean survival on Days 28, 35, and 42. Sample 12666 exhibited a statistically significant reduction in mean survival on Day 28.

Statistical Group 2 Results (Lentic, pond habitat): Sample 12671 (Ref 2-2 Ref Borrow Pit) was used as the reference site for statistical comparisons. This statistical group included samples 12612 (BP-1 Borrow Pit), 12613 (BP-1 (Dup) Borrow Pit), 12614 (BP-3 Borrow Pit) and, 12638 (BP-2 Borrow Pit). None of the samples in this statistical group exhibited statistically significant reductions in the responses evaluated.

#### **QUALITY ASSURANCE:**

A standard reference toxicant SRT test was conducted concurrently with a representative batch of *Hyalella azteca*. The resulting LC50 value fell within control chart limits and was viewed as being acceptable.

#### Summary of Statistical Tests and Probabilities

BTR:

3615

		<u>Survival</u>					<u>Gr</u>	<u>owth</u>		Neonate Production							
		Proportion	F-Test Equal	T-Test Statistical	Statistically	Average	F-Test Equal	T-Test Statistical	Statistically	Average neonates/	F-Test Equal	T-Test Statistical	Statistically				
<u>Day 28</u>		Surviving	Variance	Probability	Significant <sup>1</sup>	Weight(mg)	Variance	Probability	Significant <sup>1</sup>	female	Variance	Probability	Significant				
12552	Control	0.55				0.982											
12546	Sample	0.93	0.061	0.005		0.766	0.026	0.056									
12547	Sample	0.88	0.669	0.000		0.456	0.183	0.003	•								
12548	Sample	0.90	0.742	0.000		0.656	0.905	0.040	*								
12549	Sample	0.89	0.192	0.000	-	0.571	0.244	0.008	•								
<u>Day 35</u>																	
12552	Control	0.51															
12546	Sample	0.92	0.282	0.025													
12547	Sample	0.76	0.292	0.011													
12548	Sample	0.80	0.447	0.020													
12549	Sample	0.85	0.134	0,001													
Day 42																	
12552	Control	0.46				0.231				0.6							
12546	Sample	0.87	0.383	0.025		0.510	0.750	0.000		11.5	0.038	0.000					
12547	Sample	0.73	0.475	0.014		0.489	0.725	0.000		3.7	0.157	0.002					
12548	Sample	0.76	0.548	0.024		0.402	0.086	0.000		3.3	0.106	0.006					
12549	Sample	0.84	0.112	0.001		0.414	0.039	0.000		5.1	0.189	0.000					
	•																

<sup>1. \*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05)

#### Amphipod, Hyalella azteca, Chronic Toxicity Test Results

#### Menzie-Cura Dead Creek 99033

BTR 3615 Aquatec Biological Sciences

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Sample		Stat		Proportion	Proportion	Weight	Weight	(Ir gardeme	within Rep	Repo 14		Proportion	Mean	Hamber	) . •	Fraparlian	tu vival /	•		8 Females	Neangles	Nechales	Indial Pan	Total day	-		Replaces
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Replicate excluded from analysis. See Protocol Deviations.

15/5

## **Summary of Statistical Tests and Probabilities**

BTR:

			<u>Su</u>	<u>rvival</u>			<u>Gr</u>	<u>owth</u>		N	eonate	<b>Producti</b>	on
<u>Day 28</u>		Proportion Surviving	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant <sup>1</sup>	Average Weight(mg)	F-Test Equal Variance		Statistically Significant <sup>1</sup>	Average neonates/ female	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant
12552 12550 12551	Control Sample Sample	0.55 0.87 0.80	0.844 0.863	0.000 0.001		0.982 0.684 0.731	0.854 0.217	0.066 0.045	•				
Day 35													
12552	Control Sample	0.51 0.85	0.800	0.003									
12550 12551	Sample	0.79	0.498	0.004									
Day 42	į.												
12552	Control	0.46		0.004		0.231	0.440	0.000		. 0.6	0.000	0.005	
12550 12551	Sample Sample	0.81 0.79	0.978 0.617	0.004 0.003		0.428 0.400	0.143 0.022	0.000 0.000		4.0 3.5	0.036 0.344	0.005 0.001	

<sup>1. ^</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05)

			1			Day 1	1041				[	Day 1	Data			(tay 4	Pale		Day	15 + 4) A+	production	Dala		Per	4) Grewth	(hat e	
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Bampio	Rophisto	Gaust Court	Sim strang	Frapartion Surviving	Proportion Eurysystem	(mg)	(mg)	Organisms Waspined	me)	Rept ( (	turning	fraportion furviving	Moan Gurvival	Heanites	Eurotopa Eurotopa	Proportion Surviving	Susyte of / Sample	Heangles	Telai 6 Nonnaiss	Francisco (Res	Heanales / Female	Heanales / Gample	trillal Pan Wil (mg)	Fetal dry Will (mg)	Organisms	wellen flag (mg)	Maphaelas A M
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<sup>\*</sup> Replicate excluded from analysis. See Protocol Deviations.

## Summary of Statistical Tests and Probabilities

BTR:

			Sui	rvival			Gr	owth		N	eonate	Producti	on
<u>Day 28</u>		Proportion Surviving	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant <sup>1,3</sup>	Mean Weight(mg)	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant <sup>1,3</sup>	Mean Neonates/ Female	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant <sup>1,3</sup>
12615 12589 12590 12592 12593	Control Sample Sample Sample Sample	0.62 0.23 0.22 0.49 0.88	0.332 0.083 0.122 0.030	0.001 0.010 0.178 0.000	:	0.296 0.255 0.723 0.304 0.481	0.034 0.001 0.031 0.493	0.363 0.120 0.472 0.001					
Day 35													
12615 12589 12590 12592 12593	Control Sample Sample Sample Sample	0.36 0.08 0.26 0.40 0.89	0.515 0.138 0.159 0.066	0.001 0.200 0.364 0.000	•								
Day 42													
12615 12589 12590 12592 12593	Control Sample Sample Sample Sample	0.33 0.08 0.26 0.39 0.85	0.689 0.087 0.082 0.382	0.001 0.271 0.316 0.000		0.299 0.084 0.195 0.234 0.348	0.168 0.030 0.833 0.338	0.000 0.066 0.032 0.053	•	1.8 0.0 0.1 0.0 1.6	NA <sup>2</sup> 0.000 NA <sup>2</sup> 0.192	0.032 0.037 0.032 0.434	: :

<sup>1. \*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

<sup>2.</sup> There were not enough sample and/or control response variability to conduct a meaningful F-Test.

<sup>3.</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

# Amphipod, *Hyalella azteca*, Chronic Toxicity Test Results

#### Menzie-Cura Dead Creek 99033

BTR 3622 Aquatec Biological Sciences

			ı			Day J	t bala	-			· ·	(Pay 31	DM4			Day 4	f that a		Den	/ 35 + 47 R+	production	Data		Per	4) Chrandh	Data	
Bample		91 art		Proportion Surviving	Mean Proportion Surviving	Initial final Weight	total (by Weight	g thegantoms Watghed	militan Bay	Mean Wi Reps I ( (mg)	d the strong	Proportion Survivino	Me an Survival	Mumber Heanales	e four viving	Proportion Survivina	Mean for vival / fample	e Hennales		8 Females / Rep	Mean Neanates / Famile	Mean Heanates / Sample	Indial Fan	Telefaby Williams	d Organisms Washad		
Mumber 17615	Rophi alo A	Eaurit		0 60	- to many	(mg)	(mg)		. (mg)	. (*****	1	a ja		٥	7	0.10	i indu	4	o		0.0		30 60	11.74	- 77.47.2	10.11	<b>2</b> "
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	"	16 18	1:	0 60 0 00		24 /3	70 50		0 118		<b>'</b>	0 50	0.14	1)	١ ٠	0 40	0 31	10	"	,	7.3	1.0	27 47	20 05	•	0 345	0.700
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	ø	10	1 :	0.70							;	0 20 0 70	n 4n	n n	;	0 IO	0.39	t) D	"	1	00	0.0	79.90	// en	;	0 700	a / 14
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	N C	10 10	:	0.90							:	0.80		'n	,	0.70		n	ñ	i	0 0		23 2A	25.78	1	0.101	
	n	10	10	1 00							<b>!</b> :	0 80 0 80		4	1:	04 t) 08 t)		7	10	9	2 2 3 6		27 84 74 87	70 28 31 84	:	0 1/A	
	t t	10 10	:	0.00							;	0 MO 0 MO		í	:	0.90		10	110	í	3.0		26.77	28 /B	•	0.114	
	á	10	10	1 00							10	1 00		h O	10	1 00 0 00	0.85		;	4	15	1.6	25 91 27 03	29 M 20 76	10	0 1/1 0 2/6	D 148
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	;	10	, ,	0.70		24 03	28.08	,	0.450						1												
<u>ب</u>	K	10	!	0.00		24 19	28 64	•	0 494	0 481	1								1				<u> </u>				
$\bigcirc$	t	10	1	•	0 68	•	•		- —	0 781	└──				•												

<sup>\*</sup> Replicate excluded from analysis. See Protocol Deviations.

Summary of Statistical Tests and Probabilities

BTR:

			Su	rvival			Gr	owth		N	eonate	<b>Producti</b>	on
<u>Day 28</u>		Proportion Surviving	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant	Mean Weight(mg)	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant	Mean Neonates/ Female	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant
12615 12609 12610	Control Sample Sample	0.62 0.72 0.97	0.723 0.000	0.140 0.000		0.296 0.688 0.612	0.490 0.333	0.000 0.000					
<u>Day 35</u>													
12615 12609 12610	Control Sample Sample	0.36 0.63 0.94	0.509 0.039	0.004 0.000									
Day 42													
12615 12609 12610	Control Sample Sample	0.33 0.56 0.91	0.718 0.195	0.011 0.000		0.299 0.660 0.462	0.026 0.395	0.000 0.000		1.8 9.5 4.6	0.054 0.532	0.002 0.043	

<sup>1.</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

1			ļ			Day J	(tata					(1ey 11	trate			Day 4	l trata		(1ay	14 · 42 ft o	production	Dela		Pay	4) Greath	Data	
Sample Humber	A spike at a	Elast Enumi		Proportion But viving	Proportion	trattal Boal Walghii [mg]	for at Dry Worlds (mg)	8 Organisms Weighed	Mean Wi within Rep (mg)	Mean Wi Report L [mg]	prisivid •	Proportion Surviving	Mean Survival	Mamber Nempales	g Surviving	Proportion for string	Mean Survival / Sample	e Neenates	Talal 8 Neonales	d Fomales / Rop	Mean Heanates / Female	Mean Heanales / Sample	Indial Pan WI (mg) Số liố	Wi (mg)	e Organisms Walgiod		
13016	A B t D F F G H	16 16 16 16 16 16 16	3	8 96 6 46 6 30 6 90 6 80 6 80 6 80 6 80 6 80 6 80 6 80 6 8	•	76 73 76 74 75 67	20 60 20 61 24 20		0 118 0 234 0 134		3 1 6 7 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	0 y6 0 30 0 10 0 50 0 50 0 50 0 60 0 60	0 14	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	7 3 1 6 7 6 3	0 10 0 10 0 10 0 50 0 70 0 60 0 30 0 40	0 11	0 3 0 0 0 10	0 4 6 11 0 7 0 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	) 0 4 ) 1 2	000000000000000000000000000000000000000	10	36 56 25 66 26 74 27 47 26 68 26 68 27 47	31 75 24 84 27 02 28 40 27 03 28 14 24 28 24 85	3 1 6 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	0 174 0 400 0 200 0 200 0 274 0 275 0 277 0 362 0 363	0 799
13000	# 1	10 10 10 10 10 10 10 10 10	, , , , , , , , , , , , , , , , , , , ,	0 Ad 0 Bd 0 Bd 0 Ad 0 Ad 0 Ad 0 Ad 1 Dd 0 Bd 0 Bd	n <b>n</b> a	76 18 75 07	27 76 27 76	ì	n 117	n <b>706</b>	4 , , , , , , , , , , , , , , , , , , ,	0 80 0 80 0 70 0 50 0 50 0 40 0 40 0 70 0 80	n 4)	4 14 J 49 0 0 16 70	8 8 4 7 8	0 80 0 80 0 60 0 60 0 40 0 20 0 60	D 56	70 51 17 0 4 0	14 R5 10 48 11 r1 r1 r4 r4	1 1 1 2 4 4	6 6 13 0 6 3 18 0 13 0 5 0 4 0	• •	JF 70 JF 47 JF 20 JF 71 JF 02 JF 01 JF 06 JF 74	10 68 11 80 20 07 20 10 27 15 23 27 28 66 28 27	4 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	11 424 13 55 5 13 635 13 633 13 633 13 667 13 67 13 67	o AAc
17816	и п п п п п	10 10 10 10 10 10 10	10 3 6 10 6 10 7 10	1 00 0 30 0 40 1 00 0 90 1 00 1 00 1 00 1 00 1 00	n / 3	AA es (ш As	11 78 29 80	) )	D /W3 D ARF	o <b>4ea</b>	0 9 0 10 4 10	0 90 0 80 0 80 1 00 1 00 1 00 1 00	D 84	5.1 0 18 9 • 15 7	0 0 0 0 0 10 10	0 90 0 90 0 90 0 90 0 90 1 00 1 00 1 00	η •1	4 1 4 8 47 0	15 5 75 17 5 5 7	4 3 4	30 10 50 43 		70 06 28 90 25 97 24 93 26 19 27 99 28 80	34 85 30 29 30 29 30 09 29 08 39 60 17 83 30 17	0 0 0 0 1 10	0 511 0 400 0 400 0 461 0 476 0 404 0 377	n 482
	I J R L	+n +n +n	10 10	1 00 0 90 1 00 1 00	n v/	25 17 71 76 71 01 74 /1	30 71 28 45 10 85 11 14	10 B 18	O 484 O 870 O 807 O 641	0.812																	
	000000																			-	·····			.e. iz			

12/23

<sup>\*</sup> Replicate excluded from analysis. See Protocol Deviations.

## **Summary of Statistical Tests and Probabilities**

BTR:

			Sui	vival			Gr	owth .		<u>N</u>	eonate	Production	on on
<u>Day 28</u>		Proportion Surviving	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant <sup>1,2</sup>	Mean Weight(mg)	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant	Mean Neonates/ Female	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant
12622 12611 12612 12613 12614	Control Sample Sample Sample Sample	0.55 0.67 0.93 0.89 0.95	0.749 0.010 0.002 0.001	0.183 0.000 0.001 0.000		0.501 0.569 0.594 0.636 0.470	0.446 0.381 0.485 0.644	0.282 0.107 0.129 0.347					
Day 35											٠		
12622 12611 12612 12613 12614	Control Sample Sample Sample Sample	0.38 0.53 0.88 0.80 0.86	0.438 0.460 0.491 0.205	0.165 0.000 0.001 0.000									
Day 42													
12622 12611 12612 12613 12614	Control Sample Sample Sample Sample	0.35 0.50 0.83 0.75 0.84	0.381 0.335 0.866 0.176	0.171 0.000 0.002 0.000		0.377 0.369 0.380 0.423 0.322	0.054 0.879 0.525 0.136	0.453 0.468 0.161 0.049		4.0 3.2 4.1 4.2 5.3	0.829 0.068 0.461 0.143	0.330 0.471 0.448 0.182	

A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).</li>
 If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.</li>

			i			Day 2	Date 1				1	Day 34	PMs			Day 4	) () al a		Day	35 + 47 Rec	production (	Data	T	Day	4) Grauth	Date	
					Moan	Indial Book	Tetal Dry		Mean Wi	Mean Wi							Mean				Mean	Mean	1			Me an Wi	Mean W
Sample		Staff			Proportion	Weight	Weight	Organisms u	-			Fraparlian	Mean	Mumber	. •	Proportion		. •			Hennales		Initial Pan		Organisms		
Mumber 17677	Rophs ate	Count	grit speak	Burviving 0.30	gin same	(	(mg)	MoiBheig	( <b>**#</b> )	100	gin strand	But viving	<b>Europe</b>	Heenales	gris sisted	G 10	Sample	Hemales	Meanatre	/Rep	/ Female	/ Sample	WI (mg)	WI (mg)	Weighed	[mg] _	A - H
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	í	10	'	0 80							;	0 50		ă		0 10		•	Ö	ĭ	40		24 50	20 14		0 112	
	6	10	1 1	0 50								0.60		•		0.60		4	13	,	6.6		24 67	29 17	٨	0.417	
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		10	1 !	() 10 () <b>10</b>		24 40 24 02	78 DA	•	0 449		l .								l				1				
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	ü	10	) ;	0.80							) ;	0.70		0	4	0.60			•	3	11		76.11	70.31	4	0 111	
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	1	10	) •	0 90		77.17	25.57 25.87	•	0 1/2 0 455														i				
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	ì	in.		n An								n An		1		0.80			111	4	13		28 14 7/ 99	78 98 30 71		. 0.155	
	1,3	10	10	i no							10	1 00	0.89	•	1	n en int	0.61	A	11	:	3 <b>0</b>	4.1	26 16	20 #2	10	D 347	0.380
	14	10 10	10	0 90 0 90		25.01	11.50		0 621		1 "		17 (4.4)	•	"			·	1 "	-			'				
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	t .	10	In	1 00	0.01	72 IN	70 h7	In	0.579	0.504	١.	0.80		1	١ ,	0.60		11	10		4.0		24 82	76 <b>08</b>	4	0 160	
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	n	10		0 40							1 ;	0 90 0 70		,	;	0.70			1 14	ŝ	47		24 74	20 14	ī	0 146	
	(. D	f <i>a</i> 10	1:	0 90 0 90							1 6	0 60		7	•	0.90		26	30	ŝ	6 0		25.25	20 07	•	0.402	
0	E E	10	1 6	100							10	1 00		i	,	0 /6		70	39	4	• •		76 76 33 88	27 01	?	0 764 0 700	
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$\bigcirc$	a	10	10	1 00							10	1 00 0 80	0.86	3	',	0.70	(1 <b>84</b>	,, 6	"	'n	45	5.3	24 50	26 45	;	0.279	0.122
$\langle \rangle$	H	10 10	10	1 00 1 00		21 10	26 76	10	0.538		"	to the	1, 11,1	•				-	'	-			1				
ت	;	10	10	1 00		22 60	26.02	10	0 342						1				1								
	ĸ	10		0 80		23 07	27.05		0 400		1				l .				ł				1				
<b></b>	L	10	10	1 00	0.95	24 53	29 57	10	0 504	0 470	I				-				ı								2113

## **Summary of Statistical Tests and Probabilities**

BTR:

			<u>Sur</u>	<u>vival</u>			<u>Gr</u>	<u>owth</u>	N	eonate	<b>Production</b>	on
			F-Test	T-Test			F-Test	T-Test	Mean	F-Test	T-Test	<del></del>
<u>Day 28</u>		Proportion Surviving	Equal Variance	Statistical Probability	Statistically Significant <sup>1,2</sup>	Average Weight(mg)	Equal Variance	Statistical Probability	Neonates/ Female	Equal Variance	Statistical Probability	Statistically Significant
12622	Control	0.55				0.501						
12638	Sample	0.82	0.203	0.006		0.563	0.740	0.219				
12639	Sample	0.91	0.007	0.000		0.639	0.786	0.060				
12640	Sample	0.90	0.007	0.001		0.554	0.620	0.245				
12641	Sample	0.89	0.011	0.001		0.661	0.912	0.055				
<u>Day 35</u>												
12622	Control	0.38										
12638	Sample	0.74	0.728	0.003								
12639	Sample	0.89	0.190	0.000								
12640	Sample	0.74	0.005	0.002								
12641	Sample	0.85	0.116	0.000								
<u>Day 42</u>												
12622	Control	0.35				0.377			4.0			
12638	Sample	0.73	0.550	0.002		0.390	0.372	0.394	4.3	0.271	0.418	
12639	Sample	0.84	0.342	0.000		0.397	0.024	0.260	4.8	0.081	0.269	
12640	Sample	0.70	0.036	0.002		0.447	0.876	0.051	3.8	0.440	0.470	
12641	Sample	0.76	0.215	0.001		0.406	0.400	0.202	4.8	0.107	0.277	

<sup>1. \*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

<sup>2.</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

					•	Day 1	i Data					Pay 36	Data			they 4	(late		Day	36 + 43 R	production	Date	T .	Pay	4) Grewth	Ďate.	-
					Mean	tulisi Basi	Tatal Day		Maan Wil	Mean Wi							Mean				Mean	Mean					
Sample		<b>5141</b>		Proportion		Weight	Weight	-		Reps 14		Propertion	Mean	Humber		Proportion		•	1 1 1 1	d Females			Indial Pen	Teld de	Organisms	Mean William Rea	
Mumber	Apple at a	Court	<b>Surrey</b>	Surviving	Sur viving	(mg)	(mg)	Weighed	(~0)	( <b>~0</b> )	grantered.	Burviving	Burvival	Hennales	am same	But viving	Bampio	Hennates	Nemales	/Rep	/ Female	/ Sample	WI (mg)	WI (mg)	Weight	Imel	A H
13633	A	10	1 :	0.70							1 ;	6 76 6 76			l !	6 16 0 30					0.0		33.12	1116	ï į	0.420	
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	Ð	10		0 00							١ .	0 10		ä	ï	0 10			4	ė	00		1417	20 40	ï	8 4 10	
	ŧ	10	! !	0 20							1 !	0 10		٥	1	0 10		0	٥	0	0.0		23.67	24 18	i	0 810	
	^	10	1:	0 <b>0</b> 0							l :	0 <b>5</b> 0 0 <b>6</b> 0		•	!	0 <b>6</b> 0		:	12	,	4.0		24 44	20 14	•	0 31)	
	н	10	;	0 70							;	0 60	0 34			0 60	0.35	, ,	11	,	4 6	4.0	24 67 25 17	30 17 27 00	:	0.417	n 1//
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	, R	10	1 '	0 70 0 00	0.45	23 44 23 17	21 01 24 10	•	0 606 0 500	0 501													l				
126 28	À	10	1 7	0.40		••••		-			١ ،	0 40				0.40		,	1 ,		10		26.41	)# 00		0.645	
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	¢ .	10	10	1 00							10	1 00		•	٠ ا	0.00		20	,,	•	4.6		27.24	10 14		0 144	
	0	10	1:	0 90							l :	0 90 0 80		14	l :	0 80		11	4/	•	7.6		29 40	12.41	•	0.114	
		10		0 90 0 90							:	0 40		;	l :	0 80 0 78		17	16	1	4 6		29 O1	30 87	•	0 141	
	í.	10	;	0 90							;	0 00		;	I .	0.00		18	20	i	40		25 04	28 84 26 03		0 190 0 110	
	11	10		0 40								0 60	0 74	ò	6	0 50	0.73	0	0	1	0.0	4.3	25 48	# 01	ī	0 104	0.100
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		10	l :	0.00	0.87	2) 12	29 50	•	0 819	D 563	ŀ				1												
12839		10	10	100				-			10	ioò		4	1ó	1.00		14	18	1	àô.	· · · · · · · · · · · · · · · · · · ·	70 00	ıj îà	10	0 114	
		10		0 80								0.80		1		n no		14	17	3	4.7		ж м	20 87		0 4 IA	
	r.	10	•	n 90								0.00		0	•	0.00		•	4	3	7.0		27.41	28 17	•	0 417	
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		10	10	100							10	1 00		;	;	0.00		(	7	7	35		25 00	28 16	:	0 1/3	
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**Summary of Statistical Tests and Probabilities** 

BTR:

			<u>Su</u>	<u>rvival</u>			<u>Gr</u>	<u>owth</u>		N	eonate	<b>Production</b>	on
Day 28		Proportion Surviving	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant <sup>1</sup>	Mean Weight(mg)	F-Test Equal Variance	T-Test Statistical Probability	13	Mean Neonates/ Female	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant
12668	Control	0.73				0.477			<del>-</del>				
12664	Sample	0.90	0.559	0.012		0.443	0.439	0.312					
12665	Sample	0.89	0.237	0.014	ı <b>÷</b>	0.648	0.940	0.036					
12666	Sample	0.70	0.780	0.333		0.613	0.992	0.070					
12671	Sample	0.87	0.334	0.034		0.458	0.423	0.389					
<u>Day 35</u>													
12668	Control	0.65										,	
12664	Sample	0.83	0.763	0.046									
12665	Sample	0.85	0.521	0.030									
12666	Sample	0.64	0.786	0.438									
12671	Sample	0.85	0.480	0.022									
<u>Day 42</u>													
12668	Control	0.59				0.293				2.2			
12664	Sample	0.79	0.942	0.014		0.346	0.270	0.266		2.6	0.684	0.316	
12665	Sample	0.80	0.965	0.014		0.498	0.018	0.009		6.2	0.067	0.001	
12666	Sample	0.65	0.449	0.249		0.459	0.573	0.001		2.3	0.015	0.483	
12671	Sample	0.83	0.744	0.007		0.351	0.133	0.196		3.4	0.135	0.113	

<sup>1 \*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

<sup>2</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

## Amphipod, *Hyalella azteca*, Chronic Toxicity Test Results

#### Menzie-Cura Dead Creek 99033

BTR 3641 Aquatec Biological Sciences

						Day I	ê (Pate					Day 3	Pale			liey 4	) (talle		Day	35 + 47 R	er eduction	Deta		(1ay	41 Grawth	thata	
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<b>Limber</b>	Replicate	Count	Sur vising	Bursting	the viving	(mg)	(mg)	Weighod	(mg)	(mg)	for viving	Burviving	Sup vival	Heanales	mind	Burstising	Sample	Hennales	Henneles	/ Rop	/ female	/ Bampte	W (me)	W (mg)	Weight		A H
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RHB 12/23 Title: MC Dead Creek Ha Chronic - Prarie vs D,E,F - D28 S

pdefha8s Transform: ARC SINE(SQUARE ROOT(Y))

Chi-Square Test for Normality

#### Actual and Expected Frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	8.7100	31.4600	49.6600	31.4600	8.7100
OBSERVED	10	28	41	49	2

(p-value = 0.0019)Chi-Square = 17.0301

Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4) = 9.488 (alpha = 0.05 , df = 4)

Data FAIL normality test (alpha = 0.01). Try another transformation.

- The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: MC Dead Creek Ha Chronic - France vs D.E.F - D28 S
File: pdefha6s Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated BI statistic = 31.9155 (p-value = 0.0002)

Data FAIL B1 homogeneity test at 0.01 level. Try another transformation.

Critical B = 21.6660 (alpha = 0.01, df = 9)

= 16.9190 (alpha = 0.05, df = 9)

Using Average Degrees of Freedom

(Based on average replicate size of 13.90)

Calculated B2 statistic = 35.8140 (p-value = 0.000)

Data FAIL B2 homogeneity test at 0.01 level. Try another transformation.

Title: MC Dead Creek Ha Chronic - Prarie vs D,E,F - D28 S

File: pdefha8s Transform: ARC SINE(SQUARE ROOT(Y))

wilcoxon's Rank Sum Test w/ Bonferroni Adjustment Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG 0.05
1	12664/5	1.2601				
2 .	12549	1.2464	206.00	145	12	
3	12550	1.2104	203.00	145	12	
4	12551	1.1304	145.50	126	11	
5	12609	1.0301	138.00	145	12	*
6	12610	1.3676	246.50	126	11	
7	12611	0.9721	141.00	145	12	*
8	12639	1.2697	217.50	145	12	
9	12640	1.2582	211.50	145	12	
10	12641	1.2464	206.00	145	12	

Critical values are 1 tailed ( k = 9 )

Title: MC Dead Creek HA Chronic - Prarie vs D.E.F - D28 G

NC TRANSFORMATION Transform: File: pdefha8g

Shapire - Wilk's Test for Normality

D = 0.6397W = 0.9566

Critical W = 0.9240 (alpha = 0.01 , N = 44) W = 0.9440 (alpha = 0.05 , N = 44)

Data PASS normality test [alpha = 0.01]. Continue analysis.

Title: MC Dead Creek HA Chronic - Prarie vs D.E.F - D28 G
File: pdefha8g Transform: NO TRANSFORMATION

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 8.2709 (p-value = 0.5071)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 21.6660 (alpha = 0.01, df = 9)

= 16.9190 (alpha = 0.05, df = 9)

Using Average Degrees of Freedom

(Based on average replicate size of 4.40)

Calculated B2 statistic = 8.2198 (p-value = 0.5122)

Data PASS B2 homogeneity test at 0.01 level. Continue analysis.

Title: MC Dead Creek HA Chronic - Prarie vs D.E.F - D28 G

File: pdefha8g Transform: NO TRANSFORMATION

#### ANOVA Table

SOURCE	DF	SS	MS	F
Between	9	0.1749	0.0194	1.0325
Within (Error)	34	0.6397	0.0188	
Total	<b>4</b> 3	0.8146		

(p-value = 0.4351)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Title: MC Dead Creek HA Chronic - Prarie vs D,E,F - D28 G

File: pdefha8g Transform: NO TRANSFORMATION

N. J	Bonferroni	t-Test	-	TABLE 1	OF 2	?	Но:	Contro	ol <tr< th=""><th>eatme</th><th>nt</th><th></th></tr<>	eatme	nt	
<del>-</del>												_

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	t STAT	SIG 0.05
1	12664/5	0.5451	0.5451		
2	12549	0.5715	0.5715	-0.3140	
3	12550	0.6840	0.6840	-1.6533	
4	12551	0.7307	0.7307	-2.2099	
5	12609	0.6885	0.6885	-1.7069	
6	12610	0.6120	0.6120	-0.7961	
7	12611	0.5688	0.5688	-0.2813	
8	12639	0.6393	0.6393	-1.1206	
9	12640	0.5538	0.5538	-0.1027	
10	12641	0.6610	0.6610	-1.3795	

Bonferroni t critical value = 2.6857 (1 Tailed, alpha = 0.05, df = 9,34)

Title: MC Dead Creek HA Chronic - Prarie vs D,E,F - D28 G

File: pdefha8g Transform: NO TRANSFORMATION

	Bonferroni t	-Test -	TABLE :	2 OF 2	Ho: Contro	l <treatment< th=""></treatment<>
GROU	P IDENTIF	CATION	NUM OF REPS	MIN SIG DIFF (IN ORIG. UNITS)	% OF CONTROL	DIFFERENCE FROM CONTROL
1		12664/5	8			
2		12549	4	0.2256	41.4	-0.0264
3		12550	4	0.2256	41.4	-0.1389
4		12551	4	0.2256	41.4	-0.1856
5		12609	4	0.2256	41.4	-0.1434
6		12610	4	0.2256	41.4	-0.0669
7		12611	4	0.2256	41.4	-0.0236
8		12639	4	0.2256	41.4	-0.0941
9		12640	4	0.2256	41.4	-0.0086
10		12641	4	0.2256	41.4	-0.1159

Title: MC Dead Creek HA Chronic -Prarie vs D.E.F- D35 S

pdefha5s Transform: ARC SINE SQUARE ROOT(Y)) File:

Chi-Square Test for Normality

Actual and Expected Frequencies

INTERVAL <-1.5 -1.5 to <-0.5 -0.5 to 0.5 >0.5 to 1.5 >1.5 EXPECTED 5.7620 20.8120 CBSERVED 4 27 32.8520 20.8120 5.7620

29 23

Chi-Square = 4.3843 (p-value = 0.3565)

Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4)

= 9.488 (alpha = 0.05 , df = 4)

Data PASS normality test [alpha = 0.01]. Continue analysis.

Title: MC Dead Creek HA Chronic -Prarie vs D,E,F- D35 S
File: pdefha5s Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 23.1196 (p-value = 0.0059)

Data FAIL B1 homogeneity test at 0.01 level. Try another transformation.

\_\_\_\_\_.

Critical B = 21.6660 (alpha = 0.01, df = 9) = 16.9190 (alpha = 0.05, df = 9)

\_\_\_\_\_

Using Average Degrees of Freedom (Based on average replicate size of 8.60)

Calculated B2 statistic = 23.8757

(p-value = 0.0045)

Data FAIL B2 homogeneity test at 0.01 level. Try another transformation.

Title: MC Dead Creek HA Chronic -Prarie vs D.E,F- D35 S

File: pdefha5s Transform: ARC SINE (SQUARE ROOT(Y))

Wilcoxon's Rank Sum Test w/ Bonferroni Adjustment Ho: Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG 0.05
7	12664/5	1.1701				
2	12549	1.1872	100.50	58	8	
3	12550	1.1885	103.00	58	8	
4	12551	1.1078	70.5 <b>0</b>	45	7	
5	12609	0.9173	55.00	58	8	*
6	12613	1.3189	111.50	45	7	
7	12611	0.8058	59.50	58	8	
В	12639	1.2425	112.00	58	8	
و	12640	1.0360	65.00	58	8	
10	12641	1.1872	100.50	58	8	

Critical values are 1 tailed ( k = 9 )

Title: MC Dead Creek HA Chronic -Prarie vs D,E,F- D42 S

File: pdefha2s Transform: ARC SINE(SQUARE ROOT(Y))

Chi-Square Test for Normality

Actual and Expected Frequencies

\_\_\_\_\_\_

Chi-Square = 8.5316

(p-value = 0.0739)

Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4) = 9.488 (alpha = 0.05 , df = 4)

\_\_\_\_\_\_

Data PASS normality test (alpha = 0.01). Continue analysis.

Data PASS B2 homogeneity test at 0.01 level. Continue analysis.

Title: MC Dead Creek HA Chronic -Prarie vs D,E,F- D42 S

File: pdefha2s Transform: ARC SINE(SQUARE ROOT(Y))

# ANOVA Table

SOURCE	DF	SS	MS	F
Between	9	1.6975	0.1886	4.1806
Within (Error)	76	3.4288	0.0451	
Total	85	5.1262		

(p-value = 0.0002)

Critical F = 2.6500 (alpha = 0.01, df = 9.76) = 2.0055 (alpha = 0.05, df = 9.76)

Since F > Critical F REJECT Ho: All equal (alpha = 0.05)

Title: MC Dead Creek HA Chronic -Prarie vs D.E.F- D42 S

pdefha2s Transform: ARC SINE(SQUARE ROOT(Y))

Bonferroni t-Test	-	TABLE 1 OF 2	Ho: Control <treatment< th=""></treatment<>
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GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	TRANS t STAT	SIG 0.05
1	12664/5	1.1093	0.7875		
2	12549	1.1695	0.8375	-0.6546	
3	12550	1.1627	0.8125	-0.5814	
4	12551	1.1137	0.7857	-0.0461	
5	12609	0.8508	0.5625	2.8103	*
6	12610	1.2753	0.9143	-1.7254	
7	12611	0.7749	0.5000	3.6352	*
В	12639	1.1767	0.8375	-0.7333	
9	12640	2.9958	0.7000	1.2336	
10	12641	1.0766	0.7625	0.3546	

Bonferroni t critical value = 2.6029 (1 Tailed, alpha = 0.05, df = 9,76)

Title: MC Dead Creek HA Chronic -Prarie vs D,E,F- D42 S

File: pdefha2s Transform: ARC SINE(SQUARE ROOT(Y))

	Bonferroni t-Test -	TABLE 2	2 OF 2	Ho: Contro	l <treatment< th=""></treatment<>
GROU	P IDENTIFICATION	NUM OF REPS	MIN SIG DIFF (IN ORIG. UNITS)	% OF CONTROL	DIFFERENCE FROM CONTRO
1	12664/5	16			
2	12549	8	0.2176	27.1	-0.0500
3	12550	8	0.2176	27.1	-0.0250
4	12551	7	0.2286	28.5	0.0018
5	12609	8	0.2176	27.1	0.2250

12551 7 12609 8 12610 7 12611 8 12639 8 12640 8 12641 8 28.5 27.1 28.5 27.1 0.2286 -0.1268 0.2176 0.2875 27.1 0.2176 -0.0500 0.2176 27.1 0.0875 0.2176 27.1 0.0250

Title: MC Dead Creek HA Chronic -Prarie vs D,E,F- D42 G
Transform: NO TRANSFORMATION

Chi-Square Test for Normality

#### Actual and Expected Frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	-0.5 to 0.5	>0.5 to 1.5	>1.5
÷					
EXPECTED	5.7620	20.8120	32.8520	20.8120	5.7620
OBSERVED	3	26	27	26	4

(p-value = 0.2405)Chi-Square = 5.4917

Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4) = 9.488 (alpha = 0.05 , df = 4)

Data PASS normality test (alpha = 0.01). Continue analysis.

Data FAIL B2 homogeneity test at 0.01 level. Try another transformation.

Title: MC Dead Creek HA Chronic -Prarie vs D,E,F- D42 G

File: pdefha2g Transform: NO TRANSFORMATION

Wilcoxon's	Rank	Sum	Test	w/	Bonferro	ni	Adjustment	Ho:	Control <treatment< th=""><th></th></treatment<>	
										-
					3453337	T 3.T	אדונ בי	OD T 1	n ara	

GROUP	IDENTIFICATION	MEAN IN ORIGINAL UNITS	RANK SUM	CRIT. VALUE	REPS	SIG 0.05
1	12664/5	0.4219				
2	12549	0.4139	106.00	58	8	
3	12550	0.4280	113.50	58	8	
4	12551	0.3997	86.00	45	7	
5	12609	0.6602	147.00	58	8	
6	12610	0.4624	102.00	45	7	
7	12611	0.3694	95.50	58	8	
8	12639	0.3968	105.00	58	8	
9	12640	0.4471	114.00	58	8	
10	12641	0.4063	99.00	58	8	

Critical values are 1 tailed ( k = 9 )

Title: MC Dead creek HA Chronic -Prarie vs D.E.F- D42 Nechates

pdefha2n Transform: NO TRANSFORMATION File:

Chi-Square Test for Normality

Actual and Expected Frequencies

INTERVAL <-1.5 -1.5 to <-0.5 -0.5 to 0.5 >0.5 to 1.5

EXPECTED 5.7620 20.8120 32.8520 20.8120 >1.5 20.8120 5.7620 EXPECTED 5.7620 20.8120 OBSERVED 2 28

19 30

(p-value = 0.2302) Chi-Square = 5.6101

Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4)

= 9.488 (alpha = 0.05 , df = 4)

\_\_\_\_\_\_

Data PASS normality test (alpha = 0.01). Continue analysis.

Title: MC Dead creek HA Chronic -Prarie vs D,E,F- D42 Neonates

File: pdefha2n Transform: NO TRANSFORMATION

Bartlett's Test for Homogeneity of Variance

<u>-</u>

Calculated B1 statistic = 17.5394 (p-value = 0.0409)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

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Critical B = 21.6660 (alpha = 0.01, df = 9) = 16.9190 (alpha = 0.05, df = 9)

\_\_\_\_\_

Using Average Degrees of Freedom (Based on average replicate size of 8.60)

Calculated B2 statistic = 17.8599

(p-value = 0.0368)

Data PASS B2 homogeneity test at 0.01 level. Continue analysis.

Title: MC Dead creek HA Chronic -Prarie vs D.E.F- D42 Neonates

File: pdefha2n Transform: NO TRANSFORMATION

#### ANOVA Table

SOURCE	DF	SS	MS	F
Between	9	226.8432	25.2048	2.8493
Within (Error)	76	672.2918	8.8459	
Total	85	899.1350		

(p-value = 0.0060)

Critical F = 2.6500 alpha = 0.01, df = 9,76) = 2.0055 alpha = 0.05, df = 9,76)

Since F > Critical F REJECT Ho: All equal (alpha = 0.05)

Title: MC Dead creek HA Chronic -Prarie vs D, E, F- D42 Neonates

File: pdefha2n Transform: NO TRANSFORMATION

	Bonferroni t-Test -	TABLE 1 OF 2	Ho: Control	l <treatme< th=""><th>nt</th></treatme<>	nt
GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	t STAT	SIG 0.05
1	12664/5	4.3625	4.3625		
2	12549	5.0750	5.0750	-0.5532	
3	12550	3.9625	3.9625	0.3106	
4	12551	3.5000	3.5000	0.6399	
5	12609	9.5125	9.5125	-3.9988	
6	12610	4.5714	4.5714	-0.1550	
7	12611	3.2000	3.2000	0.9027	
8	12639	4.8500	4.8500	-0.3785	
9	12640	3.8375	3.8375	0.4076	
10	12641	4.8375	4.8375	-0.3688	

Bonferroni t critical value = 2.6029 (1 Tailed, alpha = 0.05, df = 9,76)

Title: MC Dead creek HA Chronic -Prarie vs D, E, F- D42 Neonates

File: pdefha2n Transform: NO TRANSFORMATION

Bonferroni t-Test - TABLE 2 OF 2 Ho: Control<Treatment

		NUM OF	MIN SIG DIFF	% OF	DIFFERENCE
GROUP	IDENTIFICATION	REPS	(IN ORIG. UNITS)	CONTROL	FROM CONTROL
7	12664/5	16			
2	12549	8	3.3521	76.8	-0.7125
3	12550	8	3.3521	76.8	0.4000
4	12551	7	3.5081	80.4	0.8625
5	12609	8	3.3521	76.8	-5.1500
6	12610	7	3.5081	80.4	-0.2089
7	12611	8	3.3521	76.8	1.1625
8	12639	8	3.3521	76.8	-0.4875
9	12640	8	3.3521	76.8	0.5250
10	12641	8	3.3521	76.8	-0.4750

Title: MC Dead Creek HA Chonic - PDP vs Ref,B,C - D28s Transform: ARC SINE(SQUARE ROOT(Y)) File: pdprha8s Chi-Square Test for Normality \_\_\_\_\_\_ Actual and Expected Frequencies INTERVAL <-1.5 -1.5 to <-0.5 -0.5 to 0.5 >0.5 to 1.5 >1.5 ---------------28.0720 44.3120 EXPECTED 7.7720 28.0720 7.7720 29 44 CBSERVED 34 Chi-Square = 4.1040 'p-value = 0.3921) Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4) = 9.488 (alpha = 0.05 , df = 4)

Data PASS normality test .alpha = 0.01. Continue analysis.

Title: MC Dead Creek HA Chonic - PDP vs Ref,B,C - D28s
File: pdprha8s Transform: ARC SINE(SQUARE ROOT(Y))

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Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 31.3315 (p-value = 0.0001)

Data FAIL B1 homogeneity test at 0.01 level. Try another transformation.

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Critical B = 20.0902 (alpha = 0.01, df = 8) = 15.5073 (alpha = 0.05, df = 8)

\_\_\_\_\_\_

Using Average Degrees of Freedom (Based on average replicate size of 12.89)

Calculated B2 statistic = 30.7628 (p-value = 0.0002)

Data FAIL B2 homogeneity test at 0.01 level. Try another transformation.

Title: MC Dead Creek HA Chonic - PDP vs Ref,B,C - D28s
File: pdprha8s Transform: ARC SINE(SQUARE ROOT(Y))

Wilcoxon's Rank Sum Test w. Bonferroni Adjustment Ho: Control<Treatment -

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG 0.05
1	12664/5	1.2601				
2	12666	1.0103	131.00	147	12	*
3	12589	0.4453	85.00	147	12	*
4	12590	0.4544	85.50	127	11	*
5	12592	C.7827	130.50	147	12	*
6	12593	1.2294	171.00	127	11	
7	12546	1.3047	190.00	108	10	
£	12547	1.2314	208.50	147	12	
è	12548	1.2765	243.50	147	12	

Critical values are 1 tailed ( k = 8 )

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B, C - D28 G

File: pdprha8g Transform: NO TRANSFORMATION

Shapiro - Wilk's Test for Normality

D = 1.5059W = 0.9172

Critical W = 0.9160 (alpha = 0.01 , N = 38) W = 0.9380 (alpha = 0.05 , N = 38)

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Data PASS normality test (alpha = 0.01). Continue analysis.

Data FAIL B2 homogeneity test at 0.01 level. Try another transformation.

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B, C - D28 G

File: pdprha8g Transform: NO TRANSFORMATION

Wilcoxo	n's Rank Sum Test w/	Bonferroni Adju	stment	Ho: Con	trol <tre< th=""><th>atment</th></tre<>	atment
GROUP	IDENTIFICATION	MEAN IN ORIGINAL UNITS	RANK SUM	CRIT. VALUE	REPS	SIG 0.05
1 2 3 4 5 6	12664/5 12666 12589 12590 12592 12593 12546	0.5451 0.6135 0.2550 0.7233 0.3040 0.4807 0.7662	32.00 14.00 22.00 14.00 14.00 39.00	11 11 6 11 6	4 4 3 4 3	
8 9	12547 12548	0.4555 0.6565	21.00 32.00	11 11	4 4	

Critical values are 1 tailed ( k = 8 )

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B,C - D35 S

File: pdprha5s Transform: ARC SINE(SQUARE ROOT(Y))

Chi-Square Test for Normality -----

Actual and Expected Frequencies

INTERVAL <-1.5 -1.5 to <-0.5 -0.5 to 0.5 >0.5 to 1.5 >1.5 EXPECTED 5.2260 18.8760 29.7960 18.8760 5.2260 OBSERVED 4 18 38 13 5

Chi-Square = 4.4261 (p-value = 0.3514)

Critical Chi-Square = 13.277 /alpha = 0.01 , df = 4)

= 9.488 |alpha = 0.05 , df = 4|

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Data PASS normality test alpha = 0.01). Continue analysis.

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B,C - D35 S

File: pdprha5s Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 27.4848 (p-value = 0.0006)

Data FAIL B1 homogeneity test at 0.01 level. Try another transformation.

Critical B = 20.0902 (alpha = 0.01, df = 8) = 15.5073 (alpha = 0.05, df = 8)

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Using Average Degrees of Freedom (Based on average replicate size of 8.67)

Calculated B2 statistic = 29.9957 (p-value = 0.0002)

Data FAIL B2 homogeneity test at 0.01 level. Try another transformation.

Title: MC Dead Creek HA Chronic - Frarie vs Ref, B,C - D35 S

File: pdprha5s Transform: ARC SINE(SQUARE ROOT(Y))

Critical values are 1 tailed , k = 8 %

Title: MC Dead Creek HA Chronic - Parie vs Ref, B, C - D42 S

File: Transform: ARC SINE(SQUARE ROOT(Y)) pdprha2s

Chi-Square Test for Normality

### Actual and Expected Frequencies

INTERVAL	<-1.5	-1.5 to <-0.5	~0.5 to 0.5	>0.5 to 1.5	>1.5
EXPECTED	5.2260	18.8760	29.7960	18.8760	5.2260
OBSERVED	3	26	26	17	6

Chi-Square = 4.4215(p-value = 0.3520)

Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4) = 9.488 (alpha = 0.05 , df = 4)

Data PASS normality test (alpha = 0.01). Continue analysis.

Title: MC Dead Creek HA Chronic - Parie vs Ref, B, C - D42 S

File: pdprha2s Transform: ARC SINE(SQUARE ROOT(Y))

		mp and popular	Danie	CDIM		0.70
ROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG 0.05
1	12664/5	1.1093				
2	12666	0.9567	73.00	58	8	
3	12589	0.2731	36.00	58	8	*
4	12590	0.5041	49.00	58	8	*
5	12592	0.6679	56.00	58	8	*
6	12593	1.1840	113.50	58	8	
7	12546	1.2017	85.00	34	6	
8	12547	1.0358	82.00	58	8	
9	12548	1.0753	102.50	58	8	

Critical values are 1 tailed ( k = 8 )

(p-walue = 0.0112)

Data PASS B2 homogeneity test at 0.01 level. Continue analysis.

Calculated B2 statistic = 19.7821

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B, C- D42 G

File: pdprha2g Transform: NO TRANSFORMATION

Wilcoxon's Rank Sum Test w/ Bonferroni Adjustment Ho: Control<Treatment

GROUP	IDENTIFICATION	MEAN IN ORIGINAL UNITS	RANK SUM	CRIT. VALUE	REPS	SIG 0.05
1	12664/5	0.4221				
2	12666	0.4590	119.00	58	8	
3	12589	0.0839	39.00	58	8	*
4	12590	0.1951	51.00	58	8	*
5	12592	0.2344	45.50	58	8	*
6	12593	0.3483	80.00	58	8	
7	12546	0.5100	91.00	34	6	
8	12547	0.4895	126.00	58	8	
9	12548	0.4015	100.50	58	8	

Critical values are 1 tailed (k = 8)

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B, C - D42 Neon Transform: NO TRANSFORMATION pdprha2n Chi-Square Test for Normality Actual and Expected Frequencies INTERVAL <-1.5 -1.5 to <-0.5 -0.5 to 0.5 >0.5 to 1.5 >1.5 -----------------------18.8760 5.2260 10 6 16.8760 19 29.7960 EXPECTED 5.2260 OBSERVED 1 42 \_\_\_\_\_\_ p-value = 0.0128) Chi-Square = 12.7051 Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4) = 9.488 (alpha = 0.05 , df = 4)

Data PASS normality test (alpha = 0.01). Continue analysis.

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B, C - D42 Neon

File: pdprha2n Transform: NO TRANSFORMATION

Jartley's Test for Homogeneity of Variance Bartlett's Test for Homogeneity of Variance

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These two tests can not be performed because at least one group has zero variance.

Data FAIL to meet homogeneity of variance assumption. Additional transformations are useless.

Title: MC Dead Creek HA Chronic - Prarie vs Ref, B, C - D42 Neon

File: pdprha2n Transform: NO TRANSFORMATION

 Wilcoxon's Rank Sum Test w Bonferroni Adjustment
 Ho: Control<Treatment</th>

 MEAN IN ORIGINAL UNITS
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 GROUP IDENTIFICATION
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 12664/5
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Critical values are 1 tailed ( k = 8 )

Title: MC 99033 Chronic HA - Ref Borrow Pit to Borrow Pit Refs

File: 3641ha8s Transform: ARC SINE(SQUARE ROOT(Y))

Chi-Square Test for Normality

#### Actual and Expected Frequencies

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Chi-Square = 10.0208

(p-value = 0.0401)

Critical Chi-Square = 13.277 (alpha = 0.01 , df = 4) = 9.488 (alpha = 0.05 , df = 4)

\_\_\_\_\_

Data PASS normality test (alpha = 0.01). Continue analysis.

Title: MC 99033 Chronic HA - Ref Borrow Fit to Borrow Fit Refs
File: 3641ha8s Transform: ARC SINE(SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 7.8013 (p-value = 0.0991)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)

= 9.4877 (alpha = 0.05, df = 4)

Title: MC 99033 Chronic HA - Ref Borrow Pit to Borrow Pit Refs

File: 3641ha8s Transform: ARC SINE(SQUARE ROOT(Y))

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## ANOVA Table

			•	
SOURCE	DF	SS	MS	F
Between	4	0.2459	0.0615	2.3931
Within (Error)	55	1.4127	0.0257	
Total	59	1.6585		
			n-value)	= 0 0616)

(p-value = 0.0616)

Critical F = 3.6809 (alpha = 0.01, df = 4.55) = 2.5397 (alpha = 0.05, df = 4.55)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Title: MC 99033 Chronic HA - Ref Borrow Pit to Borrow Pit Refs

File: 3641ha8s Transform: ARC SINE(SQUARE ROOT(Y))

Dunnett's Test -	TABLE 1 OF 2	Hc:Control <treatment< th=""></treatment<>
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GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	TRANS T STAT	SIG 0.05
÷	12671 12612	1.2175 1.3108	0.8667 0.9333	-1.4264	
3	12613	1.2425	0.8917	-0.3824	
4	12638	1.1555	0.8167	0.9464	
5	12614	1.3323	0.9500	-1.7549	

Dunnett critical value = 2.2300 [1 Tailed, alpha = 0.05, df [used] = 4.40) (Actual df = 4.55)

Title: MC 99033 Chronic HA - Ref Borrow Pit to Borrow Pit Refs

File: 3641ha8s Transform: ARC SINE(SQUARE ROOT(Y))

	Dunnett's Test -	TABLE 2 C	F 2 Ho	::Control<	Treatment
GROUP	IDENTIFICATION	REPS	MIN SIG DIFF (IN CRIG. UNITS)	CONTROL	FROM CONTROL
•	:267	• 5		•	

 1
 12671
 12

 2
 12612
 12
 0.1095
 12.4
 -0.0667

 3
 12613
 12
 0.1095
 12.4
 -0.0250

 4
 12638
 12
 0.1095
 12.4
 0.0500

 5
 12614
 12
 0.1095
 12.4
 -0.0833

Title: MC Dead Creek Chronic HA - Borrown Pit - D28 G File: 3641HA8g Transform: NO TRANSFORMATION

Shapiro - Wilk's Test for Normality

D = 0.1769 W = 0.9512

Critical W = 0.8680 (alpha = 0.01 , N = 20)

W = 0.9050 (alpha = 0.05, N = 20)

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Data PASS normality test (alpha = 0.01). Continue analysis.

Title: MC Dead Creek Chronic HA - Borrown Pit - D28 G
File: 3641HA8g Transform: NC TRANSFORMATION

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 4.1758 (p-value = 0.3827)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Title: MC Dead Creek Chronic HA - Borrown Pit - D28 G

File: 3641HA8g Transform: NO TRANSFORMATION

#### ANOVA Table

		•		
SOURCE	DF	SS	MS	F
Between	4	0.0966	0.0242	2.0482
Within (Error)	15	0.1769	0.0118	
Total	19	0.2735		
			(p-value	e = 0.1389)

Critical F = 4.8932 (alpha = 0.01, df = 4.15) = 3.0556 (alpha = 0.05, df = 4.15)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Title: MC Dead Creek Chronic HA - Borrown Pit - D28 G

Transform: NC TRANSFORMATION File: 3641HA8g

,	Dunnett's Test -	TABLE 1 OF 2	Ho:Control<	Treatment	
GROUP	IDENTIFICATION	TRANSFORMED , MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG 0.05
1	12671	0.4578	0.4578		
2	12612		C.5943	-1.7776	
3	12613	0.6358	0.6358	-2.3180	
4	12638	0.5 <b>63</b> 3	0.5633	-1.3739	
5	12614	0.4705	0.4705	-0.1660	
	t critical value = 2.	• • • • • • • • • • • • • • • • • • • •			

Title: MC Dead Creek Chronic HA - Borrown Pit - D28 G

Transform: NC TRANSFORMATION Transform: File: 3641HA8g

Dunnett's Test -		TABLE 2 OF 2		Ho:Control <treatment< th=""></treatment<>		
GROUP	IDENTIFICATION	NUM OF REPS	MIN SIG DIFF (IN ORIG. UNITS)	% OF CONTROL	DIFFERENCE FROM CONTROL	
2 3 4 5	12671 12612 12613 12638 12614	4 4 4 4 4	0.1812 0.1812 0.1812 0.1812	39.6 39.6 39.6 39.6	-0.1365 -0.1780 -0.1055 -0.0128	

Title: MC Dead Creek Chronic HA - Borrow Pit - D35 S

File: 3641ha5s Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's Test for Normality

Shapiro - Wirk's lest for Normality

D = 1.4376W = 0.9513

Critical W = 0.9190 (alpha = 0.01 , N = 40) W = 0.9400 (alpha = 0.05 , N = 40)

------

Data PASS normality test (alpha = 0.01). Continue analysis.

Title: MC Dead Creek Chronic HA - Borrow Pit - D35 S
File: 3641ha5s Transform: ARC SINE SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 1.0306 (p-value = 0.9051)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Title: MC Dead Creek Chronic HA - Borrow Pit - D35 S

File: 3641ha5s Transform: ARC SINE(SQUARE ROOT(Y))

# ANOVA Table

-		•		
SOURCE	DF	SS	MS	F
 Between	4	0.1592	0.0398	0.9691
Within (Error)	35	1.4376	0.0411	
 Total	39	1.5968		
 			(p-value =	0.4367)

Critical F = 3.9082 (alpha = 0.01, df = 4.35) = 2.6415 (alpha = 0.05, df = 4.35)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Title: MC Dead Creek Chronic HA - Borrow Pit - D35 S File: 3641ha5s Transform: ARC SINE(SQUARE ROOT(Y)) File:

		<b></b>		Ho:Control <treatment< th=""></treatment<>		
GROUP I	DENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN CRIGINAL UNITS	TRANS T STAT	SIG 0.05	
: 2 3 4 5	12671 12612 12613 12638 12614	1.1937 1.2320 1.1279 1.0582 1.2076	0.8500 0.8750 0.8000 0.7375 0.8625	-0.3772 0.6493 1.3378 -0.1367		

Dunnett critical value = 2.2500 /1 Tailed, alpha = 0.05, df [used] = 4,30) (Actual df = 4,35)

Title: MC Dead Creek Chronic HA - Borrow Pit - D35 S

File: Transform: ARC SINE(SQUARE ROOT(Y)) 3641ha3s

	Dunnett's Test -	TABLE 2 0	OF 2 Ho	::Control<	Treatment
GROUP	IDENTIFICATION		MIN SIG DIFF (IN CRIG. UNITS)	% CF CONTROL	DIFFERENCE FROM CONTROL
2 3 4 5	12671 12612 12613 12638 12614		0.1880 0.1880 0.1880 0.1880	21.7 21.7 21.7 21.7 21.7	-0.0250 0.0500 0.1125 -0.0125

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 S

Transform: ARC SINE(SQUARE ROOT(Y)) 3641ha2s File:

Shapiro - Wilk's Test for Normality

D = 1.5486W = 0.9444

Critical W = 0.9190 (alpha = 0.01 , N = 40)

W = 0.9400 (alpha = 0.05, N = 40)

Data PASS normality test (alpha = 0.01). Continue analysis.

-,---

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 S
File: 3641ha2s Transform: ARC SINE SQUARE ROOT(Y))

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 1.6357 (p-value = 0.8024)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 S

File: 3641ha2s Transform: ARC SINE(SQUARE ROOT(Y))

## ANOVA Table

SOURCE	DF	SS	MS	F
Between	4	0.1207	0.0302	0.6818
Within (Error)	35	1.5486	0.0442	
Total	39	1.6693		

(p-value = 0.6093)

Critical F = 3.9082 (alpha = 0.01, df = 4.35) = 2.6415 (alpha = 0.05, df = 4.35)

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Title: MC Dead Creek HA Chronic - Borrow Fit - D42 S

File: 3641ha2s Transform: ARC SINE(SQUARE ROOT(Y))

Dunnett's Test -		TABLE 1 OF 2	Ho:Control <treatment< th=""></treatment<>			
GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN CRIGINAL UNITS	TRANS T STAT	SIG 0.05	
·	12671	1.1634	0.6250			
2	12612		0.8250	0.0421		
3	12613	1.0727	0.7500	0.8628		
4	12638	1.0383	0.7250	1.1891		
5	12614	1.1727	0.8375	-0.0885		

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 S

File: 3641ha2s Transform: ARC SINE(SQUARE ROOT(Y))

Dunnett's Test -		TABLE 2 OF 2		Ho:Control <treatment< th=""></treatment<>		
GROUP	IDENTIFICATION	NUM OF REPS	MIN SIG DIFF IN ORIG. UNITS	% CF CONTROL	DIFFERENCE FROM CONTROL	
:	12671	£				
2	12612	<del>5</del>	0.2035	24.1	0.0000	
3	12613	ê	0.2035	24.1	0.0750	
4	12638	Ē	0.2035	24.1	0.1000 <b>—</b>	
5	12614	£	0.2035	24.1	-0.0125	

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 G

File: 3641ha2g Transform: NO TRANSFORMATION

Shapiro - Wilk's Test for Normality

D = 0.2110W = 0.7981

Critical W = 0.9190 (alpha = 0.01 , N = 40) W = 0.9400 (alpha = 0.05 , N = 40)

Data FAIL normality test (alpha = 0.01). Try another transformation.

Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 3
File: 3641ha2g Transform: NC TRANSFORMATION

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 12.0775 (p-value = 0.0168)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 G

File: 3641ha2g Transform: NO TRANSFORMATION

Steel's Many-One Rank	Test -	Ho: Control <treatment< th=""></treatment<>
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GROUP	IDENTIFICATION	MEAN IN ORIGINAL UNITS	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1 2 3 4 5	12671 12612 12613 12638 12614	0.3511 0.3804 0.4231 0.3904 0.3224	74.00 87.00 73.00 53.00	47.00 47.00 47.00 47.00	8.00 8.00 8.00	

Critical values are 1 tailed ( k = 4 )

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 Neonates

File: 3641ha2n Transform: NO TRANSFORMATION

Shapiro - Wilk's Test for Normality

D = 171.0025W = 0.9663

Critical W = 0.9190 (alpha = 0.01 , N = 40) W = 0.9400 alpha = 0.05 , N = 40)

\_\_\_\_\_\_

Data PASS normality test alpha = 0.01%. Continue analysis.

Title: MC Dead Creek HA Chronic - Borrow Fit - D42 Neonates
File: 3641ha2n Transform: NO TRANSFORMATION

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 1.5641 (p-value = 0.8152)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 Nechates

File: 3641ha2n Transform: NO TRANSFORMATION

ANOVA Table

SCURCE	DF	SS	MS	F
Between	4	14.9375	3.7344	0.7643
Within (Error)	35	171.0025	4.8858	
Total	39	185.9400		

 $\{p\text{-value} = 0.5556\}$ 

Since F < Critical F FAIL TO REJECT Ho: All equal (alpha = 0.05)

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 Neonates

File: 3641ha2n Transform: NO TRANSFORMATION

ll i	Dunnett's Test -	TABLE 1 OF 2	Ho:Control<	reatment	
GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG 0.05
1 2 3 4 5	12671 12612 12613 12638 12614	3.4125 4.0750 4.1750 4.2750 5.3125	3.4125 4.0750 4.1750 4.2750 5.3125	-0.5994 -0.6899 -0.7804 -1.7192	

Dunnett critical value = 2.2500 (1 Tailed, alpha = 0.05, df [used] = 4,30)

(Actual df = 4,35)

Title: MC Dead Creek HA Chronic - Borrow Pit - D42 Neonates

File: 3641ha2n Transform: NO TRANSFORMATION

	Dunnett's Test -	TABLE 2 O	F 2 Ho	:Control<	Treatment
GROUP	IDENTIFICATION	NUM OF REPS	MIN SIG DIFF (IN ORIG. UNITS)	% OF CONTROL	DIFFERENCE FROM CONTROL
1 2 3 4 5	12671 12612 12613 12638 12614	8 8 8 8 8	2.4867 2.4867 2.4867 2.4867	72.9 72.9 72.9 72.9	-0.6625 -0.7625 -0.8625 -1.9000

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## **Aquatec Biological Sciences**

Chain-of-Custody Record

75 Green Mountain Drive South Burlington, VT 05403 TEL; (802) 860-1638 (1) FAX; (802) 658-3189

COMPANY INFORMATION		COMPAN	 IY'S PRO.	JECT INFORM	IATION		SHIPPING INFORMATION	-		ME/CON PRESEI	_		
									<u> </u>	THE GILL		<u>-</u>	
Name: Menzie Cura & Associates	11,	roject Nan	ne: <u>Deac</u>	l Creek Sedim	ent Tox	Carrier:		40C		ļ			1
Address: One Courthouse Lane, Suite 2	2				į	Į						_	1_ 1
Chelmsford, MA 01824	Þ	roject Nun	nber: <u>99</u>	033		Airbill N	umber:	plastic					
Telephone: (978) 453-4300	s	ampler Na	ler Name(s):				Present		l				
Facsimile: (978) 453-7260			1		Date Sh	ipped:		_	_	_	_		
Contact Name: Ken Cerreto, Ph.D.								Lgat			'		}
	c	)uote #;	3/99	Client Code;N	MENGUR	Hand Do	elivered:No	J. S.					!
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# Aquatec Biological Sciences Chain-of-Clistody'Record



75 Gronn Mountain Drive South Builington, VI 0540 161: (802) 860-1638 FAX: (802) 658-3188

COMPANY INFORMATION	COMPAN	9775 PRO	л су ил ови	MOLLON	SHIPPING INLORMATION		AUJOV I		TAINI R	14147	
Name Menzie Cura & Associates Address One Courthouse Lane, Soile 2	Project Nac	ne Dea	d Creek Godin	nor Lox	Coulei	4ºG					
Chelmsford, MA 01824	Project No	nbar. 99	0033		Airbill Number.			F			* . ~ ~ ~ ~
Telephone (978) 453 4300	Sampler Na	mie(s):			, <del></del> ,	plastic				1	
Lacsimile (978) 453-7260					Date Shipped			· · · · · · · · · · · · · · · · · · ·			٠.
Contact Name - Ken Cerreto, Ph D	İ					1 gal					
	Quote #	3/99	Client Code	ML NGUR	Hand Delivered Yes No	1 ',,,,,					
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# Aquatec Biological Sciences Chain-of-Custody Record

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COMPANY INFORMATION	COWLVNI	'S PROJECT INFOR	ΜΛΤΙΟΝ	SHIPPING INFORMATION			ME/CONTAIN PRESERVAT	
Name: Menzie Cura & Associates	Project Name	e: Dend Greek Sedir	nent Tox	Garrier:	-40C			
Address: One Courthouse Lane, Suite 2 Chelmsford, MA 01824	1	ber: <u>99033</u>		Airbill Number:	plastic	_		
Telephone: <u>(978) 453-4390</u> Facsimile: <u>(978) 453-7260</u>	Sampler Nan	ne(s):		Date Shipped:		_		
Contact Name. Ken Cerreto, Ph.D.	Quote #:	3/99 Client Code	MENCUR	Hand Delivered:YesNo	1 gal			
SAMPLE IDENTIFICATION DA	LLECTION   TE TIME	GRAB COMPOSITE	MATRIX	ANALYSIS / REMARKS	<u> </u>	NUMB	ER OF CON	TAINERS
BTOX- D - 2 10/			Sediment	Hyalella azlaca 10-d Survival & Growth Hyalella azlaca 42-day Chronic Toxicity Chironomus tantans 10-d Survival & Growth Chironomus tentans Chronic Toxicity	/	T=0,5		
BTOX-D-Z-Z 10/	/	V	Sediment	Hyalella azteca 10-d Survival & Growth Hyalella azteca 42-day Chronic Toxicity Chironomus tentans 10-d Survival & Growth Chironomus tantans Chronic Toxicity	/	T.o. S		
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#### CHAIN OF CUSTODY RECORD

Project No.   Project Mame:	Project Location:	The section of the Contract to
648B Souget-AlaI- Dead Grock	Sougel/Cahokia III	MENZIE-GURA & ASSOCIATES, INC.  1 COURTHOUSE LANE, SUITE 2
	Analyses Required	CHELMSFORD, MA 01824
DATE: 10/6/99		TEL: 978/453-4300 FAX: 978/453-7260
SAMPLERS Chemine, K. Fogorty.	3 to 5 to 5 to 5 to 5 to 5 to 5 to 5 to	,
T Tmo	No. of S	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
SAMPLE ID Date Comp. Grato Station Locations  Fig. 1 19/4/20 9:50 Dead Comp. Sect. Fig. 1	A ×	NOTES
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3P-1 11:30 Donow P. T	2 X 2 X/	
3P/(v.pc) 11:30	A X	
Respondshed fly: (Stupaturk)  (At-M14M)   NAME   10/6/99   1900	Hoselved By: (Signature) Date Time  -Karana Minor 10/7/77/020	Romarks: Note () Harleca/
Relinquished By: (Signature) Dale Time	Received By: (Signature)   Date   Time	C. Lentans acute/
Relinquished By: (Signature) Date Time	Received By: (Signature) Date Time	Note () Harlera/ C. Lentans acule/ Conomic sediment/ -10 KICITY Healts
Aquatech	Phone:	10 KICITY HEALS
Contact Person: Phil. Downey	=117	a b l m i

Via Feder in 3 coolers

(00 let 1/2 Jens = 3, 18 - 83 + E3 (00 let 1/2 Jens = 3, 20 - BAFF 1 0F) (00 let 1/3 Jens = 2, 50 F)

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DATE 10/ 1/99  SAMPLERS C. N. C		<i>I</i>	Project Countl	on. /Called Sally Analyses Re		*	MENZIE-GURA & ASSOCIATES, ING 1 COURTHOUSE LANE, SUITE 2 CHELMSCORD, MA 01824 TEE: 970/453-4300 FAX 970/453-7260
	Station Locations  Burnow Vil  Dead Could with	·	No, of Containurs ਜ਼ਰ ਜ਼ਰ ਜ਼ਰ ਹੈ.	が			NOTES  CLCI COCO CLCO CLCO
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Laboratory: NguaYech	tinin	limm	iteceived thy: (51g) Phone:		() a	e Hane	
Contact Person: Phil Down	4			<u>.</u>			

## CHAIN OF CUSTODY RECORD

Project No.				C . J Av	con "I"	Project Local		. 1	7	 71		MENZIE-CURA & ASSOCIATES, INC.
6460	1710	9 V		- Sauged Av	٠ لـ ا بـ	Sauget-Cohokis, III.						1 COURTHOUSE LANE, SUITE 2
DATE: 10/	18/90	/					Anal	yses R	oquired		r	CHELMSFORD, MA 01024 TEL: 970/453-4300 FAX: 970/453-7260
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SAMPLE ID	Date	Comp.	Grah	Station Locations		Containers	103					NOTES
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#### CHAIN OF CUSTODY RECORD

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ŀ	DATE 10/	199						1.00	7	]	j	=	TEL: 978/453-4300 FAX: 978/453-7260
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	SAMPLE ID	Data	Comp.	Grati	Station Locations		No. of Containers	1 x 3					NOTES
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Project: 99033 Dead Creek BTR: 3615 Client: Menzie-Cura & Assoc. Test Start: October 19, 1999 Day 28: November 16, 1999

			11/16/99		Repick	Total	# Weighed	Init Pan Wt.	Total
Sample	Repl.	# Alive	Init.	Repick #	Init.	Surv		1771.	Dry Wt.
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	В	10	7(2			10	<del>-</del>	-	-
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	1	10	RB			10	10	24.59	<u>32.33                                  </u>
	J	7_	J	0		7	7	24 35	30.13
	K	9	7			9	9	25.41	31.88
	L	9	16-			9	9	26.86	33.57
12547	Α	10	RB		~	10	-	-	_
1 m W - 7 !	В	4	RB			9	-	-	
	C	<u> </u>	RB			9	-	_	-
	D	10	Tm			10	-	-	_
	E	8	TM		RB	8	-	_	
	F	10	Tim			10	_	-	-
,	G	9	76			9		_	-
′	H		RR		RB	5	-	-	-
		a	36			9	9	23.55	27.42
	j	9 4000				9	9	22.62	
	K	7,100	RB	0		5	5	23.08	2494
	L	10	m			10	10	24.60	28.89
			''''						100.01
12548	Α	10	TM			10	<del>-</del>	-	-
	В	10	RB			10	-	-	-
	C	+3	₹G-		<u></u>	3	-	<u>-</u>	-
	D	10	RB			10	-	-	-
	Eigag		RB		<u> </u>	9	-	-	-
	F	9	76			9	<del>-</del>	-	-
	G	10	RIS			<u>[D</u>	<u>-</u>	-	-
	Н	10	<u> </u>			10	<u>-</u>	<u>-</u>	-
	1	10	TM		<u> </u>	10	10	28.70	3294
	J	3	TM	0		8	8	24.16	30,91
	K	9	RB			9	9	27.33	33.38
	L.	10	m			10	10	25.52	30.84

Fungal growth on top of sediment; also a dead Triputidax formel, 76

Date: 142495

Date: 15/22/95 Reviewer: haday28.occ

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

R zero Lound rape C but 20 in my 1) - marks in OCO 2085 The

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3615
	Test Start: October 19, 1999	Day 28: November 16, 1999

ج العدرية	0	Donl	# A I	11/16/99	D ! - ! - #	Repick	Total	# Weighed	Init Pan Wt.	Total	
٦	Sample 12549	Repl.	# Alive	Init.	Repick #	Init.	Surv			Dry Wt.	
ļ	12045	В	4	RB			9	<del>-</del>	_	_	
1		C	8	RIS	0	76-147	8	<del></del>	_	-	
Ì		D	0	7)(-		20 //	70	-	<u>-</u>	_	
ł		E	10	RB	-		10	-	-	_	·
1		F	10	TM			10	-	-	-	
		G	9	.16	)		9	-	-	-	
1		Н	8	TM	3	RB11/17	8	-	_	_	
		1	9	TM			9	9	24.64	29.75	
		J	S	76	- 0		8	8	27.33	30.71	
1		K	7	76	0		7	7	29.10	33.68	
L		L	વ	RB			9	9	25,92	31.69	
Γ	12550	Α	6	JG			6	-	-	-	l
		В	10	36		~	10	-	-	<del>-</del>	
		С	7	RIS	0	JG1/17	7	-	-	-	
		D	7	RB	D	RBW.	, 7	-	-	-	
ı		E	10	RB			10	-	-	-	
		F	li	76			U	-	-	-	
		G	10	RB			19	-	-	-	
7		Н	4	JG-			7		-	-	ew <sup>q</sup>
-		1	10	RB	_	_	10	10	26.35	32.15	(2 m. 53 al
- [		J	8	15	0		8		21.83	27.15	Xeli, Vinesh
١		K	9	Tm				9	26.99	31.65	Harry Man 11/28
L		<u> </u>	9	JG			9	9	27.82	32.99	
Γ	12551	Α	10	36			0	-	-	-	
J		В	9	TM			9	-	-	-	
ł	·	C X	20	>6			8	-	-	-	
		D	10 10	RB			iQ	-	-	-	
1		E	96	16			6	-	-	<b>-</b>	
١		F	9	16			9	-	-		
		G	7	Tm	0	RBIN	_7		-		
-		H	56	30			8	<u>-</u>	-	-	
ł		-	<u> </u>	TM	0	····	<u>(</u> 0	<u></u>	29.97		
		J	9	TM	<u> </u>		9	9	23.15	29.29	
		K	<u>(o</u>	$\frac{\eta_1}{2}$	0,		6	9	24 90	29.85	
ļ	Polonia C	C: Init	8	RB	) Final (	20 /	٥	8 Palanas As	22.98	29.41	
ł	Balance C		ial (20 mg = ം വ് emp(°C	14.98 ) 80°C 11			1.98)	Balance As		Init.	n
ł			ms in Replica			ater only exp	osure. Orga	nisms in Rep	licates I - L to		
									DE, 40		

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Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3615

Test Start: October 19, 1999 Day 28: November 16, 1999

Sample	Repl.	# Alive	11/16/99 Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan <b>W</b> t.	Total Dry Wt.	
12552	Α ,	8	TM	0	JEIN	7.8	-	-	-	]
	Branc	2	RB	٥	JG-1/17	2	-	-	-	]
	С	9	RB	0	JG11/17	8	-	-	<u> </u>	]
	D	7	TM	O	RB 1m	7	-			
	E	5	RB	D	16417	5	-		<u>-</u>	
	F	5	JG	0	RB11/-	5		-	-	]
	G	8	TM	0	KBMU	8			-	
	Н		RB	O	R34n	7	-	-	-	Ì
		4	TM	<u> </u>	,	4	4	24.28	36.97	1
	J	3	२८	Ć.		3	3	23.53	26.46	
	K	4_	m	<u>C</u> ,		4	4	3462	29.45	
	<u>L</u>	5	JG	C	/	5	5_	29.02	34.38	
	Α			<del></del>			-	_	-	1
	В						-	/ -	-	
•	С						-/	_	-	[
1	D							-	-	· ·
	E						/ -	-	<u>-</u>	
<b>[</b>	F						-	<u>-</u>	-	
	G						-	-	-	
	Н						<u> </u>	<u> </u>	-	`
	1							····		
	J			- <u></u> -						]
	K									
	L		·							
	Α		!				-	<del>-</del>	<del>-</del>	I
	В						_	<del>  -</del>	-	1
	C		<del></del>				-	_	_	1
	D						-	-	_	1.
	E						-	-	-	i
	F	-					-	<del>-</del>	<del>-</del>	1
	D E F G		/			<del></del>	-	<del></del>	<u> </u>	1
	Н	/	1				-	<del>-</del>	-	ĺ
	1	/_		_	-			•		1
	J								<del></del>	
	K									1
	L									1
Balance C		al (20 mg =				(45)	Balance As			·
		. «Temp(°C		nt 7m			, √Temp(		Init. 77	
Comments	Crganise	ns in Replica	ites A - H tra	nsferred to w	ater only expos	sure. Orga	nisms in Rep	licates I - L 1	o dry weight	analysis.

Reviewer \_\_\_\_\_ Date. 12/21/49
haday28 doc
Laboratory Aquatec Biological Sciences, South Burkington, Vermont

#### Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3615

Test Start: 10/19/99 Test End: 11/30/99

٦		Day 35 (11/23/99)				-		Day (11/3	/ 42 0/99)		
ľ	Sample	Rep	# Adults	# Neona tes	# Adults	# Femai es	# Males	# Neona tes	# Weighed	Init Pan Wt.	Total Dry Wt.
t	12546	A B	-10	23	Z	6	d	36	3408	28,18	31.05
1	*	С	9	<del>-</del>	<u> </u>	4	4	29	7608	20.34	25.10
		D E	17	24	16	8	8	17	16	26.73	30.14
		F	9	42 33	9	55	4	43 24	9	26,73	31.54
		GН	9	30 29	9	6	<u>ろ</u> 5	27	9	25.62	30.00 29.99
þ	12547	Α		2	10	-1	3		10	27,35	31.58
	12041	В	8 10	15	10	<i>y</i> (a	a	92	8	25.57	29.03
1		C D	248	14	3	5 2	3	0	8	25.71	29.40 30.84
		Е	A5	0	4	ſ	3	0	4	22.82	-24.43
1	(	F G	8	6	\$	4	3	14 5	3	25.13	28-53 30.92
السا	! 	Н	7	8	7	5	<u>a</u>	16	7	25,67	30.27
T	12548	Α	<u>i0</u>	18	9,	S	3	10	8	24.82	28.39
1		B C	10	21	10	0	4	13	10 i	2563	29.04
ļ		D	10	13	9	_5_	4	18	9	23,71	26.68
		E F	16/28	5	8	2	4		8	28,19	31.48
		G H	8	17	11	<del>9</del> 3	2	26	1118	29,62	34.23
F	12549	A	10	5	G		<u>3</u>	15	1 (	27.07	26.75 30.78
	12549	В	9	16 5	8	<u>5</u> a	<u>5</u>	5	8	27.18	30.89
		C D	8	23	8	19 م	<u>3</u>	21	8	25.91	29.66
		Е	B.89.	9	9	6	2	9	9	25.11	28.36
		F G	189	14	9	5	4	16	$\frac{q}{a}$	24,96	32.37
		Н	7	1:	7	5	2	27	7	26,55	29,60
	Day 35 In Balance C					Final (20		y 42 Initia		1   30   9   Asset #:	TM JG
سا .الس	Date/time	In/1/30	<u>/6:40</u> Тетр	(°C) 82	_ Init. <	JG-	Date/tim	ie out 16	30 ia) Tem	p(°C) 79°	Init. TM

Reviewer: JG Date: M249.

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

A see dy 28 data

# Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3615

Test Start: 10/19/99 Test End: 11/30/99

		_	/ 35 (3/99) -				Day (11/3	/ 42 0/99)		
Sample	Rep	# Adults	# Neona tes	# Adults	# Femal es	# Males	# Neona tes	# Weighed	Init Pan Wt.	Total Dry Wt.
12550	Α	G	11	5	a	3	8	5	23,82	26.51
	В	10	17	10	7	3	18	10	123,93	28.05
	C	7_	3	6	<u>ર</u> 5	4	3	<u> 6</u>	21.63	24.42
	D	7	3	7		<u>a</u>	18	<del></del>	21,47	24.02
	E	10	0	10	5	5	9	10_	22.04	25.98
	F	11	7	10	5	.5	_0_	10_	27.01	31.05
-	G	0	4	10	(e	4	7	10	25,41	29.37
	Н	- 1	- !	7	5	ュ	29	7	27.51	30.67
12551	Α	10	16	10	7	3	7	10	23.66	27.37
 	В	8	7	-9		4	21	7	32.74	26.67
	С	19	4	1900	152	75.4	22	19	22.84	26.97
į	D	9	3	9	8	1	14	9	27.84	31.09
	E	6	1	5	_3	2	5	5	27.37	29.21
	F	8	7	8	6	2	12	3	27.92	31.04
	G	6	10	6	3	<u>  3                                  </u>	9	6	22.35	24.94
	Н	8	1	8	3	5_	5	8	27,31	30.82
12552	Ā	7-	0	7	3	4	0	7	31,20,	23.07
	<u>B</u>	0	0							
	C	6	0	6		<u> </u>	_0_	6	26.72	28.36
	D	5	3	0	_3	_3_	_Q_	6	26.56	27.95
	E			4	<u>a</u>	<u>2</u>	<u>_</u>	4	25.01	26.19
	F	5	0	7	_4_	0_	<u> </u>	3	27:23	
	G H	<u>ع</u>		3	+	1	<u> </u>	3	B.10	28.79
	<u></u>	<del></del>	2	<u></u>	<u> </u>	3	<u> </u>	<u>+</u>	26,31	28.55
	Α								1	
	В									
	С									
	D				<u>.</u>					
	E									
	F	 							!	
	G	<u> </u>		ļ	<del></del>					
	Н								<u>:</u>	
Day 35 In			23 JM				y 42 Initia	is / Date:		2 JE
Balance C		itial (20 m		) Init	Final (20		)	Balance		C Init The
Date/time	1/1	Temp	X-C)	Init.		Date/tim	ne out ; s 3	c 124 Tem	p(°C) 74	" Init. 7M

Laboratory Aquatec Biological Sciences, South Burkington, Vermont

		Initial D	ry Weight Data	· · · · · · · · · · · · · · · · · · ·	
Replicate	# Weighed	Initial Boat Weight (mg)	Final Dry Weight (mg)	<i>Mean</i> Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)
1	10	34.93	36.75	0.182	
2	10	39.47	41.06	0.159	
3	10	33.28	35.05	0.177	
4	10	31.92	33.69	0.177	
5	10	35.86	37.65	0.179	
6	10	31.28	33.01	0.173	
7	10	36.13	37.90	0.177	
8	10	40.46	42.30	0.184	0.176

### Hyalella azteca Initial Dry Wt.

Project: Ha	10/19 Chronin		
Culture ID: 10	112	Age: 7 à	

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)
1	10	34.928	36.75
2	10	59.472	41.06
3	10	65 678	35.05
4	10	31.922	33.69
5	10	35 85F	37.65
6	10	3, 276	33.0)
7	10	36. 129	37.90
8	10	B40 40 40.456	42.30
Initials:			
Date:			

Balance QC:	Initial (20 mg =	1996	Final (20	mg = 19.96 ).	Balance Asset #:	
Date/time In/2/	Temp(°C.	829C Init	93	Date/time out /25	12:00 Temp(°C) So	Init.
Comments:				1		

Reviewer Date 12/29
haintwit doc
Laboratory Aquatec Biological Sciences South Burkington, Vermont

#### **Organism Holding and Acclimation**

Species: Hyalella azteca	Date Received: 10/15/99 No. Rec. 900
Supplier: ARO	Hatch Date: 10/12/99
Apparent Conditon: Excellent	Culture ID: 10/12

Acclimation / Holding Procedures: Transfer to holding culture boxes, add laboratory water. Acclimate to water to be used for testing (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.

<u>Daily Feeding</u>: 1:1 mix of *Selenastrum /* YCT, 1-3 mL (maintain hint of green algal coloration on culture box bottom). Also, pinch of ground Tetrafin/Ceraphyll. Do not allow excess food/fungus to accumulate.

Monitoring: Examine over a light box daily, record apparent condition. Temperature daily; pH, D.O, on Mon., Weds., Fri., (miniumum). Conductivity weekly.

Test starts: record date, time, initials for sediment test and SRT test starts.

1999					Cond		Water		
Date	Fed	Temp	pН	D.O.	uct.		Chg.	Age (Days)	Init.
· <del>-</del>	T 2		,		<del>,</del>	,	- 1		<del></del>
10/15	YELTC	15.7			<u> </u>		Added	3	17C
<del></del>	T	<del></del>	<del>,</del>			<del>y</del>	171	T	<del></del>
10/16	XTsel	22.7	<u> </u>	<u> </u>	<u> </u>	<u> </u>		4	JG
	K	000		1	T	<del>,</del>			т = =
10/17	YCTSel.	99'9-	8.(	8.3	1,000		<u></u>	5	JG
10/18	Finhn	20.1	· · · · · ·	1	1	r <del></del>	Added	16	
10/10	1,6,7-11	22.4	<u> </u>	L	<u> </u>		riaceo	6	<u> </u>
10/19	627	22.9	8.0	8.5	800	Γ	1	7	148
10/10	<u> </u>	laa.	0.0		1000	<u> </u>			<u> </u>
10/20				· <del>-</del>			T	8	1
			· · · · · ·	<u> </u>		<del></del>	_ <del></del> _	I	
- <del></del>									T
					<u> </u>		<u> </u>		
				,	<del></del>		<del></del> -		
<del> </del>	<u></u>	L	<u> </u>						<u> </u>
								T	
	<u></u>			l	L				<u> </u>
	<del></del>	<del> </del>		<del></del>	<del></del>		<del></del>	т	Т
	<u> </u>	L	<u> </u>		1.,	observed		<u> </u>	<u></u>

<sup>\*</sup> N = normal, appear healthy. Record # dead if any observed.

Sediment test start (Date/time/Init.) 10/19/99 18100 SRT test start: (Date/time/init.)



Organism History

I.

## Aquatic Research Organisms

### DATA SHEET

Species:	Hyale//g azteca
Source:	Lab reared Field collected
	Hatch date 10/12-199 Receipt date
	Lot number 10 1299 HA Strain ARO
	Brood Origination USFWS MO
II. Water Qu	ality
	Temperature 24 °C Salinity ppt DO 7.6
	pH 7.4 Hardness Ppm
III. Culture C	Conditions
	System: FW STATK (CARUS)
	Diet: Flake Food V Phytoplankton Trout Chow V
	Brine Shrimp Rotifers Other
	Prophylactic Treatments:
	Comments: 424 HRS OLD AT COLLECTION
IV. Shipping	-
	Client: ARUATCH BIOLONAOC# of Organisms: 9001
	Carrier:
Biologist:	Atom Sintali
	10/16
(5 <sup>3</sup> 3	10/16 Temp=22.7°C 1-800-927-1650 Fa)- JG
120,200	PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650 (1000) 1000
PH 7720300	Added Sed, Recon. 420 T= 22.2.c
4EN FED	VCT/Sel/TC PHES.13 FED

oject: Menzi	e-Cura & Associates	Pro	ject: 99	033 De	ad Cree	k .		BTR: 3	615 Tes	st Start	10/19/9	9
						Day	of Ana	ysis				
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	10
12546	T (°C)	23.1	225	22.4	21.6	22.6	222.5	3	122.8	22.4	21.9	229
	рН	7.8	Ce		7.7		_	7.6	_	7.7		7.
	DO (mg/L)	7.2	6470	7.0	6.2			6.1		5.9		5.8
	Conductivity	450	X	X	Х	Х	Х	Х	300	X	Х	X
12547	T (°C)	23.2	22-2	22.3								20.7
	рН	7.6			7.5			7.5		7.5		7.
	DO (mg/L)	6.5	5.49	5,5	5.1	_		5,4		5.2		5.7
	Conductivity	430	X	×	Х	Х	Х	Х	310	Х	X	Х
12548	T (°C)	23.4	22.20	22.4								) ) ) (1)
	рН	7.7			7.6			7.5		7.5		7.5
	DO (mg/L)	6.2	5-750	010	5.3	_		5.7		2.2		5:6
	Conductivity	400	Х	Х	Х	Х	X	X	300	X	Х	Х
12549	T (°C)	23.2	22.19	22.2								22 7
	рН	7.8	7,	_	7.7			78		8.0		8.3
	DO (mg/L)	6.8	6,300	6.7	6.2			6.4		6.0		5.8
	Conductivity	390	X	Х	Х	Х	Х	Х	290	X	Х	X
<del></del>	Init./Date (1999):	10/19	10/20	19/21	19/22	19/23	19/24	10/25	19/26	19/27	19/28	10/29

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Edwar List

Review: \_\_\_\_\_ Date: 12/22/49

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

	-Cura & Associates				ad Cree					7. 0.0	10/19/9	
						Day	of Ana	lysis				
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	
12550	T (°C)	22.3	22.80	122 <	1						<del>                                     </del>	در
	pН	7.9	-	·—	7.7			1.8	78	7.8		8
	DO (mg/L)	7.3	6.600	7.0	6.5			6.6	- A	57	<del> </del>	5
	Conductivity	380	x \	X	X	×	×	×	290	X	X	1
12551	T (°C)	22.7	22.2	22.0							†	<u>ට</u> බ
	pH	7.9	70	_	7.8	_		17.8	79)	7.9		8
	DO (mg/L)	6.4	1.3	6.7	6.5			0.1	5.81	15.8		5
	Conductivity	380	X	X	X	Х	X	X	300	Х	X	
12552	T (°C)	22.0	22.8	22.1								)) /
	pH	7.6		_	7.8			79		7.9		7
	DO (mg/L)	8.7	7.7	7,5	7.4		_	7.5		7.4		(
	Conductivity	420	X	X	X	Х	X	X	300	X	X	7
12549	T (°C)											
0	pН											
	DO (mg/L)											1
	Conductivity	A * (W) (B) W W W	Х	X	X	X	X	Х		X	X	
	Init./Date (1999):	10/19	10/20	19/21	10/22	19/23	10/24	10/25	19/26	10/27	10/28	19/

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 29, 49, and end of test.

Date: 12/22/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ect: Menzie	-Cura & Associates	Pro	ject: 99	uss De	ad Cree				75 105	Start.	10/19/9	9
						Day	of Anal	ıysıs —		_		
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	
12546	T (°C)	22.8	22.7	23.3	22.3	23.8	23.7/21	22/22	22.7/	219	22.3	77
	рН			69	<b>X</b>	7.8		7.8	/ 2		7.6	
	DO (mg/L)			7.3		6,5		6.4			6.6	
	Conductivity	Х	Х	Х	310	Х	X	X	Х	X	310	ļ -
12547	T (°C)	222/					,					
	pН			74		7.6		7.6			7,4	
	DO (mg/L)			7.0		6,2		64			6,4	
	Conductivity	X	Х	X	320/	Х	Х	Х	Х	Х	310	
12548	T (°C)	22.0/8										
	pH			7.5		75		7.5			7.5	
	DO (mg/L)			7,3		5,9		(2)			6.7	
	Conductivity	X	Х	Х	320	X	Х	X	Х	Х	320	
12549	T (°C)	22.623										
	рн			7.9		7.7		77			7,6	
	DO (mg/L)		/	7,2		6,4		6.8			6.7	
	Conductivity	Х	Х	Х	320	Х	X	Х	Х	Х	330	ı
	Init./Date (1999):	10/30	10/3/	11/12	11/2 m	11/3	11/4	11/5	11/6	1/m.	11/8	14

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ject: Me <u>nzie</u>	-Cura & Associates	Pro	ect: 98	033 De	d Cree		of Ana		615 Tes	t Start	10/19/99	)
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	2
12550	T (°C)	22.5	_									
	pH			7.8		7.7		7.7			7.7	
	DO (mg/L)		_			7.2		6,3			65	
	Conductivity	X	X	X	220	X	×	X	X	×	330	>
12551	T (°C)	224										
	pН			8,0	,	7.9	,	7.8			7.7	
	DO (mg/L)			6,9	*************	7.0		6.3			6.3	
	Conductivity	X	X	X	335	, X	X	X	X	X	340	7
12552	T (°C)	23.1										
	pН			7.9	İ	7.9	Ì	78			7.8	
	DO (mg/L)			7.9		7,2		74			72	
	Conductivity	X	X	x'	320	X	X	X	Х	X	320	· · >
· · · · · · · · · · · · · · · · · · ·	T (°C)											
	рН											
	DO (mg/L)											
	Conductivity	×	×	X		X	X	X	Х	X		7
	Init./Date (1999):	10/80	10/31	146	1/1/2	11/3-	11/4	11/5	11/6	13/7	11/8_	4

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 49, and end of test.

Review: Date: 14249
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L-1 pratory: Aquatec Biological Sciences, South Burlington, Vermont

28 J

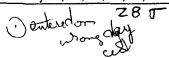
						Day	of Anal		615 Tes			
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	Τ
12546	T (°C)	22.7/129	22.1/	220	23.62	22.2.9	22.1	27.3/27	12.8	V35 4	23.7/12	12
	рН	7.6		7.7	, Ju		7.6	7.5	79	2 y 34	7.9	
	DO (mg/L)	5.9		7.0			6,8	63	7.80		7.8	
	Conductivity	Х	Х	Х	Х	Х	X	325	Х	X	290	
12547	T (°C)					27.3						
	рН	7.5		7.6			7.5	F/. Y	78		7.8	T
	DO (mg/L)	6.0		7.3			6.9	6.1	79		19	
	Conductivity	Х	Х	Х	Х	Х	X	310	′x/	Х	X 310	
12548	T (°C)											T
	рН	7.5		7.6			7.6	7.5	79		7.9	
	DO (mg/L)	5.4		7.4			6,8	5.8	74		7,9	
	Conductivity	X	Х	X	X	Х	X	320	X	Х	X 7/0	
12549	T (°C)										-5	
	рН	7.7		7.7			7.7	77	7.40		7.9	
	DO (mg/L)	6.2		7.3			7.0	14	7. July		79	
	Conductivity	Х	X	X	Х	X	X	310	X	X	X	
	Init./Date (1999):	11/10	1//11	11/12	1413	11/14	146	11/16	11/17	11/18	11/19	11

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Review: J Date: 1/22/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont



	-Cura & Associates	<u> </u>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	9033 Dea			of Anal	BTR: 36 ysis	710 100	, Otall	10/10/0	
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	3
12550	T (°C)			<del>                                     </del>						235		_
	рН	7.7		77		7.7	- 47	7.7		250	1.9	ļ <u>.</u>
	DO (mg/L)	1		7.0		1	7.7	1.1			<del>                                     </del>	
	Conductivity	6.1 X	×	X	×	7.5 x	×	300	×	×	7.9	
12551	T (°C)							700			, , ,	-
	рН	77		7.8		78		7,7			7 6	<del> </del> -
	DO (mg/L)	5.8				1		1 / 1			7.9	
	Conductivity	X	x	7,0	×	7,0_ X	×	7,20	X	х	X	,
12552	T (°C)			<del>                                     </del>	- <del></del>		,				3-0	
	рН	7.9		7.9		7.9	2.5	7.8			7.9	
	DO (mg/L)	7.4		7.8		7.6		7.6		<u> </u>	78	
	Conductivity	X	X	X	X .	X	Х	3c1)	Х	X	X 3,c	,
<u> </u>	T (°C)											
	рН			(								
	DO (mg/L)	·										
	Conductivity	X	X	×	×	×	X	. /2-4.1.	×	×	X	,
	Init./Date (1999):	11/19	1/1/1	14/12	11/13	11/14	11/15	11/16	11/17/	11/18	11/19	11/2

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Review: \_\_\_\_\_\_ Date: 12/22/99

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ect: Menzi	e-Cura & Associates	Pro	ject: 99	033 De	ad Cree				615 Tes	t Start	10/19/99
						Day	of Anal	ysis			
Sample	Parameter	33	34	35	36	37	38	39	40	41	42
12546	T (°C)	23335	3335	32X34	33/24	23:36	72.8/	22.24	22.5	23.6	22.3
	pH		8.0	7.9			79			8,0	7-7
	DO (mg/L)		8.2	82			8,2			8.5	7.8
	Conductivity	Х	Х	180	X	Х	Х	Х	Х	Х	270
12547	T (°C)			/							444
	рН		8.0	7,9			79			7.9	67.6
	DO (mg/L)		8,1	8,0	,		8,2			8,4	7.5
	Conductivity ### / Pmm	Х	Х	1901	X	Х	Х	Х	Х	X	280
12548	ੋਂ (°C)			//							
	рН		8.0	7.9			78			7.9	7.7
	DO (mg/L)		8,20	17.5			8,2			8.4	7.7
	Conductivity AtH/Hmm.	Х	Х	29%	γ X	Х	Х	Х	Х	X	289
12549	T (°C)						λ,				
	рН		8.0	7.9			7.8			7.9	7.7
	DO (mg/L)		8.2	9:77			8.3			8,5	78
	Conductivity	Х	Х	309/	X	Х	X	X	X	Х	270
	Init./Date (1999):	1//21	11/28	11/23	11/24	1/1/25	11/26	1,1/27	11)/28	11/28	11/32

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

			/	, ,	_
Review:	$\bigcirc$	Date:	12/	22/9	22

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

·	-Cura & Associates					Day	of Anal			st Start	
Sample	Parameter	33	34	35	36	37	38	39	40	41	42
12550	T (°C)		<u> </u>								
	рН		8.0	79			7.8		<del> </del>	7.8	7.7
	DO (mg/L)		8,2	78			8.3			8.4	7.8
	Conductivity	X	X	3,00	X	Х	X	Х	Х	X	<del> </del>
12551	T (°C)										<b> </b>
	рН		8.0	79			7.8	W. 11 May 1- 1-		7.8	7.7
	DO (mg/L)		8.1	7.9			8.2		The second resident agreement	8.4	75
	Conductivity	×	X	299	X	×	X	X	X	XI	170
12552	1) (11 /////////////////////////////////			V							
	рН		8.0	79			7.8			7.8	7.7
	DO (mg/L)		8.2	19	,	İ	8.2			8.3	7.4
	Conductivity	X	X	2.88	×	×	X	X	Х	X	270
<del></del>	Ť (°Ć)										
	pН										
	DO (mg/L)							_			
	Conductivity	×	×		×	×	×	X	X	X	<del>   </del>
- <del></del>	Init./Date (1999):	11/21	1,1122	11/23	11/24	11/25	11/26	11/27	111/28	11129	141/30

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

eview: \_\_\_\_\_ Date: 12/22/99

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Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3622

Test Start: October 20, 1999 Day 28: November 17, 1999

Sample	Repl.	# Alive	11/16/99 Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12589	A	, 0	1G			0	-	-	-	
Petrstern hydrocarbon odor	Bzden	3	RB	Ü	Balis	3		-	-	
- Down	С	2	RB	0	(142	2.		-	-	
() & Marc	Digrag	Ò	TM		N. S.W.	0	-	-	-	ŀ
hydrocks	E	0	JG	0	KBYn	0	-	-	-	ŀ
704.	F	,2	16			>	-	-	-	
<b>5</b> 0	G W		78	0	01/23	_0	-	-	-	
	Н	0	ADD	<b>?</b> )	RBMB	0	-	-	_	
	ı	Ö	<b>PD</b>		-	٥	-0-	26,71		
	J	7	DUP			7	7	28.50	30.22	
	K	.5	Res			5	5	29,67	32.31	
	L	8	Das	<i>1</i> _		රි	8	27,38	29.35	
12590	Α	3	RB	Ü	RIS	3	-	-	-	
	В	0	TM	0	RB	0	-	-	_	
	С	2	JG	D	11/23	TØ2	-	-	-	
	Day	0	15	0	R	8	-	-	-	
Pinoleum	E	0	TM			0	-	-	-	
16494	F	10	Tm			10	-	-	-	جعنوبه م
	G	.3	13 G	0	RBHR	3	-	-	-	
•	H	4				4	-	-	-	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
	1	1	PUD			1		25,20	26.50	
	J	1	Pup			1,	1 /	23.74	24.61	
	K	18	TM			18	18	25,19	30.72	
- ·	L	<u> </u>	48			0	0	27,75		
12591	Α						-	-	-	
	В						- /		<b>-</b>	
	С							-		
	D .	<u></u>					-	-	-	
,	E						-	-	-	
	F						-	-	-	i
	G						-	` -	-	
;	Н						-	-	-	
	1									
	J									
	K	/								]
	L	· ,	<b>T</b>							]
Balance C	C: Initi	al (20 mg =	\$19.98	) Final (2	20 mg =	)	Balance A			
Date/time	In 11/23 17	:coTemp(°C	C) 80	nit. JG	Date/tim	e out 11/29	ას <sup>ქე</sup> Temp	(°C) SI	Init. Th	
Comments	. Organisr	ns in Replica	ates A - H tra	nsterred to w			inisms in Kep	oncates I - L	to dry weight	analysis.

Reviewer: \_\_\_\_\_ Date: )2/22/99.
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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3622 Test Start: October 20, 1999 Day 28: November 17, 1999

			<u> </u>	lest Star	t: Octobe	r 20, 199	9 Day	28: NOV	ember 17,	199
Sample	Repl.	# Alive	11/16/99 Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	<u> </u>
12592	Α	, 10	RB	-	_	10	-	-	-	ĺ
	B \ 35		176	0	RBMA	5	-	-	-	
	С	1	Tm	0	RB 47	i	-	-	-	
	D	5	TM	0	7n 11/17		-	-	-	
	Eira		RB	0	Tm ali7	2	<u> </u>	-	-	
	F	2	m	0	RB4.1	2	-	-	-	İ
	G		RB	0	1m 117	2	-	-	-	
	H_	4	15			9	-	- 0	-	
	1	ð	Pena	<u> </u>	<u>i                                      </u>	_0_	0	2619		
	J	0	RB			10	10	24,109	30.06	
	K	]	RB	0_	1611/27		7	29.48	31.77	
	L	2	26			<u> </u>	_6_	24.01	26.12	
12593	Α	9	RB	-		9		-	-	
	В	9	RB			_9	-	_		
	С	ŝ	<b>S</b> 3		<u> </u>	_8	-		-	ļ
	D	/O 8	JG		·	10	<u> </u>		-	
	E	8	Tm	<u> </u>	"7TM	_\$				İ
	F	9	m			9	-		-	
	G	<u> </u>	75			01	<u> </u>		-	
	H	<u> </u>	JG-			9	0;			
		9	TM	~ s, e.?	111-2.2	9	11	23.03	27.51	
	K	7	<u> </u>			7	3		2808	
<b>(</b> )	L	<u>q</u>	$\frac{Q}{10}$			7-	H	24.19	2864	,
			70			7		2267	33.17	
12609	Α	<u> </u>	26			<u>&amp;</u> _	-	<del>-</del>	-	
	В	<u> 5</u>	16-	<u> </u>				-	~	ļ
	C	<u>6</u>	<u> </u>	1 rk		<del></del>	ļ <del>.</del>	-		İ
	D	<u> 국</u>	I'M		1"/2)		<u> </u>	<u>-</u>	-	Į
	E F	1	KB	<u>U</u>	T"/23	7		<del>-</del>	-	
	G		36		27	<del></del>	-	•	-	İ
	H	<u> </u>	im	0_	<u> </u>		<del>                                     </del>	<del>-</del>	-	
		<u> 70</u>	J-			<del>- (                                   </del>	<del>  \</del>	26.18	3117	
	<del>'</del>	6	43	<u></u>	JE 1/12		<del>                                     </del>	25.92		
	<del>K</del>	10	m	$-\underline{\varepsilon}$	<u> </u>	9	10	25,86		
	<del></del>	3	R3		J6-11/27	-3	13	2683		
Baiance C	:C: Ind	al (20 mg =				in (COM)	Balance A		3.0 7	
Date/time	In	Temp(°C	C) 1	nit	Date/tim	e out 1129	ルが Temp	(°C) (Si	Init.	
Comments	. Organisi	ns in Replica	etes A - H tra	nsferred to v					to dry weight	
	1		2/22/99		12593 L	- was t	proven dau	ا مه ال ا ، ا	14199 10	,
Reviewer Naday28 doi	$\mathcal{L}_{\mathbf{a}}$	Date	447		~ 26°22 ~ _	Hercer $\hat{I}$ .	rumar ja Lumar ja	J, 154	occurred	<b>k.</b>
		iological Scien	nces South Bu	rlangton Vermi	ont Exc	woe Mo	~ 051E	suctysis		Uz

Client: Menzie-Cura & Assoc. | Project: 99033 Dead Creek | BTR: 3622 | Test Start: October 20, 1999 | Day 28: November 17, 1999

Sample	Repl.	# Alive	11/16/99 Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
12610	Α	9	TM			9	-	-	-
	В	10	L RB			10	-	-	-
	С	9	JG			9	<u> </u>	-	-
	D	10	RIS	)	)	10		-	-
	E	20	Tm	1	)	20		-	-
	F	10	RB	-	l	10			-
	G	10	TIM		(	10			-
	Н	10	16			(Ó_	-	-	-
	1	10	TM			10	10	25,37	30.21
	J	9	10			9	9	23.79	a9.45
	K	10	J			/0	10	23.93	30.85
	L	10	KB		_	10	ίð	24.71	31.14
12615	Α	9	Tm			9	_	_	
,	В	5	Tm	01117	Tm	5	-	_	
	c	a	m	D	RBILLI	2	-		_
	D	9	36	-		<u> </u>	_	<del>-</del>	
	E	7	RB	0	m 11+	3	_		_
	F	6	m	0	RB4/17	6	-	_	-
	G	5	73	6	RB 1/17	5	_	-	-
i	Н	6	RB	Ö	TMILIT	G		-	-
i	1	$\overline{q}$	<u></u>			9	9/	26,73	29.59
	J	8	7	0	J61/17	8	8	26.74	28.53
	K	5		0	15 4/27	5	3	23,67	25.29
	L	6	TM		16 v/27	7	63	25.89	27.79
	^								
	A B							-	-
}	C							<u> </u>	
	D								
}	E			<del></del>					
ļ	F			·	-		-		-
ł	G							<u> </u>	-
}	H								
ļ	<del>''</del>						<u> </u>	<del>                                     </del>	
	J					<del></del> -	<del> </del>	<del> </del>	
	K				<u></u>	<u> </u>	<del> </del>		<del> </del>
	<del>                                     </del>						<del> </del>	<del>                                     </del>	<del> </del>
Balance C	C: Initi	al (20 mg =	20.00	) Final (	20 ma = ⊃	200 14	/1 <del>B</del> alance As	sset #	<u> </u>
		Temp(°C		nit.	mg	700 1/m	16:50Temp	(°C) <i>\{\ilde{\gamma}\)</i>	

Reviewer: \_\_\_\_\_ Date: \_\_\_\_12/22/99 haday28.doc

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

#### Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3622

Test Start: 10/20/99 Test End: 12/01/99

			/ 35 (4/99)				-	/ 42 1/99)		
Sample	Rep	# Adults	# Neona tes	# Adults	# Femal es	# Males	# Neona tes	Weighed	Init/Pan WL	Total Dry Wt.
12589	Α						7	24,597,		
	В	ا ا	0	2	2	0	0	34550	2	25.012
	С	a	Ō	.2	2	0	0	72,303	٦,	27.769
	D							<del>à`</del>		
	E									
	F	<u>a</u>	0	2	2	9	0_	37 782	<u> </u>	28.799 H
; ;	G									22.753
	Н						·			
12590	Α	3	0	3	1	2	0	24917	3	25.891
	В		1							
	С	<b>ス</b>	0	ス	0	2	0	17.51	<u>a</u>	28.145
i	D		1							
	E									
	F	9	O	9	5	4	3	38.795	9_	31.721
	G	3	0	3		_ತ್ತ	0,	23.97	3	25.017
	H	4	0	4		3	0	27.219	4	28.188
12591	Α									
	В									
	С									
	D									
	E			· · · · · · · · · · · · · · · · · · ·						
	F						<u> </u>			
	G									
	Н									
12592	Α	10	0	10	4	3	0	25.08	iO	28.091
	В	4	0	4	3	l	0	25.94	4	26.839
	С		0	1	1	0	0	26.66	i	210 968
	D	4	0	4-	3		0	27.25	4	28-124
	Ε	_≼	0	2	2	0	0	28.23	<u>á</u>	28-904
	F	ュ	Ö	2	2	0	<u>U</u>	29.70	<u>ą                                    </u>	30.127
	G	<u>2</u>	0			0	0	26.35		26.479
	H	7	ر م	7	5	<u> </u>	0	25 90	<del>}</del>	27.900
Day 35 In			29 Jm		F:- 1:0-		/ 42 Initia			7m
Balance (			<b>'g =</b> <b>&gt;(°C)</b> <del>7</del> <	) Init_	Final (20		) Na Out 13 la	Balance A		Init The
DOIC/BILE	111 [2]]	でを回り	1 U) 7 U	· IIII.	.Tm	Date:tim	ב טטו (ארו פ	2 (6/3c Temp	10) 14	Init. 1)m

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#### Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3622

Test Start: 10/20/99 Test End: 12/01/99

MAL	Day 35 (11/24/99)			Day 42 (12/01/99)						
	<del>,</del>	(11/2			<del>,</del>	,		1/99)		
Sample	Rep	# Adults	# Neona tes	# Adults	# Femal es	# Males	# Neona tes	# 🕍 Weighed	∖ Init Pan Wt.	Total Dry Wt.
12593	Α	9	0	9	5	4	a	28,406	9	31.993
	В	9	0	8	2	6	0	18 442	8	30.687
	С	8	0	7	3	4	0	23.256	4	25.793
	D	9,	4	9	5	4	o <del>7</del>	22,864	9	210.279
	Ε	188	ナ	8	5	3	11811	28.819	8	31.840
	F	'9	9	9	5	4	10	25.773	9	28.790
	G	10	0	10	6	4	19	25.808	10	29.535
	Н	9	0	8	-2	6	723	27.034	8	29.262
12609	ΙΛ	9		0		2	COLLEGION-	17.291	१	2- 1-01
12009	В	8	G 14	8	<u>5</u>	3	28	21.011		30.681
	C	7	2			3	51	37.465	-8	31.886
	D	5	10	95	3	<u>2</u>	0	25.256		29.073
1	E	5	70	4	3	3	4	24.709	5	27.145
Ì	F	4		ر 2	2	3	0	25.093	<del></del>	<del>                                     </del>
1	G	7	15	<u>a</u> (9	4	2	a	99,014	2	23.770
ual 🗸	H		29		5	1	46	24.857		28.860
		6	21	(9			70	27.150	<u> </u>	28.765
12610	Α	9,	11	9	5	4	4	30,045	9	34.648
-	В	89	0	9	3	6	3_	92.80 2	9	30.289
1	С	9	19	9	5	4	6	25.967	9	30.271
}	D	10	9	9	4-	5		~ ~ ~	9	29.076
}	E						8	24639		47.676
		19	4	16	10	6	8	25:155	16	29.820
	F	19	4	16	5		8	25.755	16	29.820 29.600
	F G	10	<u>                                     </u>	10	5 4	6	8 <del>1</del> 2 0	25.755	16 R 10	29.820 29.600 32.831
	F	9	11	16	5	6	8	25.755	16 R 10	29.820 29.600
12615	F G H	10 10	11 7 6	10	5 4 3	6 3 6 7	8 42 0 13	25.755 26.191 27.894 26.597	16 8 10 10	29.820 29.600 32.831 30.374
12615	F G H	10 10 2		10	5 4 3 2	6 3 6	8 42 0 13	25.755 26.191 27.894 26.597 30.496	16 8 10 10	29.820 29.600 32.831 30.374 31.249
12615	F G H	10 10	11 7 6 0	10	5 4 3 2 2	6 3 6 7	8 42 0 13	25.755 26.191 27.894 26.597 30.496 25.658	16 8 10 10	29.820 29.600 32.831 30.374 31.249 26.858
12615	F G H	9 10 10 2 3	11 7 6 0 0	10 10 2 3 1	5 4 3 2 0	6 3 6 7	8 42 0 13 0 4	25.755 26.191 27.894 26.597 30.496 25.658 26.744	16 8 10 10	29.820 29.600 32.831 30.374 31.249 26.858 27.018
12615	F G H A B C	9 10 10 2 3 1 5	11 7 6 0 0 9	10 10 23 15	5 4 3 2 2 0 4	6 3 6 7 0 1	8 42 0 13 0 4 0 2	25.755 26.191 27.894 26.597 30.496 25.658 26744 37.474	16 8 10 10 3 1	29.820 29.600 32.831 30.374 31.249 86.858 27.018 28.597
12615	F G H A B C	9 10 10 2 3 1 5 2	1176000090	1980 10 23 152	5 4 3 2 0 4 2	6 3 6 7 0 1 1	8 42 0 13 0 4 0 2	25.755 26.191 26.597 26.597 30.496 25.658 26.744 26.581	16 8 10 10 2 3 1 5	29.820 29.600 32.831 30.374 31.249 26.858 27.018 28.597 27.028
12615	F G H A B C D E	9 10 2 3 -5 26	11 7 6 0 0 9	000 2m-1520	5 4 3 2 0 4 2 3	6 3 6 7 0 1	8 42 0 13 0 4 0 2	25.755 26.191 26.597 26.597 30.496 25.658 26.544 26.581 26.590	16 8 10 10 10 37 1-5 26	29.820 29.600 32.831 30.374 31.249 86.858 27.018 28.597 27.028 28.155
12615	F G H A B C D E F	9 10 2 3 1 5 2 5	11 7 6 0 0 9 0 7	198000 23-15293	5 4 3 2 0 4 3 3	6 3 6 7 0 1 1	8 42 0 13 0 4 0 2 0	25.755 26.191 27.894 26.597 30.496 25.658 26.744 26.581 26.590 25.447	16 8 10 10 10 37 1-5 26	29.820 29.600 32.831 30.374 31.249 26.858 27.018 28.597 27.028 28.155 26.276
<b>12615</b> Day 35 li	F G H A B C D E F G	9 10 2 3 1 5 2 6 5 5	11 7 6 0 0 0 9 0 7 0 1 1	000 2m-1520	5 4 3 2 0 4 2 3	6 3 6 7 0 1 1 0 3 1	8 42 0 13 0 4 0 2 0	25.755 26.191 27.894 26.597 30.496 25.658 26.744 26.581 26.590 25.444 26.590 25.444 26.590	16 8 10 10 3 1 5 2 6 3	29.820 29.600 32.831 30.374 31.249 60.858 27.018 28.597 27.028 28.155 26.276 28.850
Day 35 II	F G H B C D E F G H nitials /	9 10 10 3 15 2 5 5 Date: 11	11 7 6 0 0 9 0 7 0 12	1980 100 231 52934 (5)	5 4 3 2 0 4 3 3	6 3 6 7 0 1 1 0 3 1	8 12 0 13 0 4 0 2 0 0	25.755 26.191 27.894 26.597 30.496 25.658 26.744 26.581 26.590 25.444 26.590 25.444 26.590	16 8 10 10 3 1 5 2 6 3	29.820 29.600 32.831 30.374 31.249 60.858 27.018 28.597 27.028 28.155 26.276 28.850

Reviewer: Date: 12/22/45

1) Three 2ddizind neurois found in rinse. 0.7/1/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Initial Dry Weight Data							
Replicate	# Weighed	Initial Boat Weight (mg)	Final Dry Weight (mg)	Mean Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)		
1	10	33.82	34.48	0.066			
2	10	37.73	38.35	0.062			
3	10	42.53	43.23	0.070			
4	10	40.06	40.54	0.048			
5	10	43.76	44.43	0.067			
6	10	40.22	40.73	0.051			
7	10	30.44	30.89	0.045			
8	10	38.71	39.37	0.066	0.059		

#### Hyalella azteca Initial Dry Wt.

Project: '	3rd Set C	honic	10/20/99	
Culture ID:	Ha. amuo	10/13/199	' Age: 7	73
		7.7		

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)
1	10	33.819	34.48
2	10	37.732	38:35,
3	10	42.527	43,263,1G
4	10	40.063	40.54
5	10	43.758	44.43
6	10	40.222	40.73
7	10	30,439	30.89
8	10	38.704	39.37
Initials:			
Date:			

Balance QC:	Initial (20 mg =	19.96	)	Final (20	mg =/9,96	) Balance Asset #:	
Date/time In 17	/4 (&:SDTemp(°C)	82%	Init.	<i>y</i> 8	Date/time out /	ia/5/2:a/Temp(°C) 80	Init.JG
Comments:							

Reviewer: Date: 12/22/99.

haintwt.doc
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

#### **Organism Holding and Acclimation**

Species: Hyalella azteca	Date Received: 10/15/99 # Rec. 1000
Supplier: ARO	Hatch Date: 10/13/99
Apparent Conditon: Excellent	Culture ID: 10/13

Acclimation / Holding Procedures: Transfer to holding culture boxes, add laboratory water. Acclimate to water to be used for testing (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.

<u>Daily Feeding</u>: 1:1 mix of Selenastrum / YCT, 1-3 mL (maintain hint of green algal coloration on culture box bottom). Also, pinch of ground Tetrafin/Ceraphyll. Do not allow excess food/fungus to accumulate.

<u>Monitoring</u>: Examine over a light box daily, record apparent condition. Temperature daily; pH, D.O. on Mon., Weds., Fri., (miniumum). Conductivity weekly.

Test starts: record date, time, initials for sediment test and SRT test starts.

1999		T	-11	20	Cond	Water	A (Davis)	1:4
Date	Fed	Temp	рН	D.O.	uct.	Chg.	Age (Days)	Init.
10/15	45 TC	16.0		1		Holand	2	JG
					•	1:1		
10/16	ye Tsel	229					3	JG
10/17	xtel	32.Y	7.8	7.7	900		4	NG
10/18	Tembr	326				Added	5	
10/19	y Car	22.7		<u>f</u>			6	Th
10/20		23.5	7.7	6.9	800		7	VG
10/21	H H	24.0	7.7	7.0	800		8	12m
				-				
				<u>.</u>				
					l i			
			<u> </u>	i				
		near hea			ad if any obse			Ι

* N = normal, appear healthy. Reco	rd # dead if any observed.	
Sediment test start (Date/time/Init.)	SRT test start: (Date/time/init.) _	/



Organism History

I.

## Aquatic Research Organisms

## DATA SHEET

Species	Hyalella azteca
Source:	Lab reared Hatchery reared Field collected
	Hatch date 10/13/99 Receipt date
	Lot number 1013 99 Hg Strain AFCO
	Brood Origination USFWS MO
II. Water	Quality
	Temperature 24 °C Salinity ppt DO 7, 6
•	pH 7.4 Hardness 180 ppm
III. Culture	e Conditions
	System: FW STUTIC MEMAL
	Diet: Flake Food Phytoplankton Trout Chow
	Brine Shrimp Rotifers Other
	Prophylactic Treatments:
	Comments: L24 HRS OLD AT COLLECTION
	·
• •	ng Information
	Client: ARUATE SH BICKWARD of Organisms: 1600
15.6	Carrier: FOD E Date Shipped: 10/14/99
1015 26 Biologist:_	Atan Sintoli
16. 10.115 Biologist:	16/16 75
A CONTRACTOR	1-800-927-1650  1-800-927-1650  Teny=22,9℃
X 72350	
16. 720 720 705 720 705 720 705 720 705 720 705 720 705 720 720 720 720 720 720 720 720 720 720	Added Sed. Nec. Hzo  Added Sed. Nec. Hzo  MED  Maniple Road - Hample Roa
()	10 / set // C

Sample	Parameter	Day of Analysis										
		0	1	2	3	4	5	6	7	8.	9	10
12589	T (°C)	22.9	23,0	22.57	22.5	3234	23 1/2	23. 12.34	22.9	22.7	227	00.3
	рН	7.8	_	7.7	,		7.8		7.7	•	7.8	
	DO (mg/L)	6.8	5,9	5.8		_	6.7		6.1		10-1	
	Conductivity	400	X	X	X	X	X	Х	320	X	X	X
12590	T (°C)	22.9	22.1						37.8	227	231	23.1
	рН	7.8	_	7.8			7.8		7.7		78	
	DO (mg/L)	68	63	6.2	_		6.5		6-1		5.9	
	Conductivity	400,	X	X	X	X	X	Х	320	X	X	X
12591	T (°C)	23.2	22.6								22.5	22/2
	pН	7.7		7.7	_		7.7		7.6		7.7	
	DO (mg/L)	7.6	7.2	7.4	<b>1</b>	_	7.4		7.2		7.2	
	Conductivity	380/	X	X	X	X	X	X	310	X	Х	, X
12592	T (°C)	23.2	22.4								20.8	02.7
	рН	7-8		7.8	_		7.8		7.8		78	
	DO (mg/L)	6.8	6.2	6.3	_	_	10.60		6.9		10.2	_
	Conductivity Ammana 4 Att	380,	X	Х	X	X	X	X	315	Х	X	Х
	Init./Date (1999):		1924	10/22	19/23	10/24	-10/25	19426	18/27	19/28	19/29	10/30

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH \$ times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 49, and end of test.

Review: Date: 12/22/55

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

<del></del>	e-Cura & Associates		Project: 99033 Dead Creek         BTR: 3622 Test Start 10/20/9           Day of Analysis           0         1         2         3         4         5         6         7         8         9									
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	ļ
12593	T (°C)	229	22.6					<del> </del>			2.9	2:
	рН	7.7	_	78			7.8		7.8		78	
	DO (mg/L)	5.5	5,3	6.4		_	64		6.2		(0.0)	
	Conductivity	400,		Х	Х	Х	X	Х	330	Х	X	
12609	T (°C)	22.9	221								21.8	22
	На	7.5		7-6		_	76		7.5		7.6	-
	DO (mg/L)	4.6	4.5	5.1		_	5.7		5.3		5.7	_
	Conductivity	420		Х	Х	Х	, X	Х	330	Х	Х	
12610	T (°C)	23.0	22,5								22.7	دتن ر
	рН	7,8	_	7-8		_	78		7.7		7.8	<u> </u>
	DO (mg/L)	6.9	6.0	6-0	_		66		6.2		6.2	_
	Conductivity	509/	, X	Х	Х	X	Х	Х	322	Х		
12615	T (°C)	23.1	22,7								22.920	<i>3</i> 2
/	рН	7.4	-	7.7			7.8		7.7		7.8	_
	DO (mg/L)	8-2	7,5	7.5	/	/	7.4		7.4		6.8	
	Conductivity	500,	X	Х	Х	X	Χ,	Х	320	Х	Х	
	Init./Date (1999):	19/20	10/21	19/22	10/23	19/24	10/25	10/26	19/27	19/28	10/29	10

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 29, 40, and end of test.

28 5

act. Hallel	-Cura & Associates	1 110	, <del>561.</del> 35		ad Cree				010 188	t Start	פופע וטו	
						Day	of Anal	ysis			6	
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	Π
12589	T (°C)	203	23.4	11 y 1	33.73	30%/5	23/3	3	21.4	22.3	22.15.7	23
	рН	7	7.8		7.8		7.9			7.7	7.7	17
	DO (mg/L)		7.1		6.6		67			6.9	6.4	6
	Conductivity	Х	X	X	339/	Х	X	X	Х	X	315	1
12590	T (°C)		7.8	22 4 7							22.7 23	22
	рН		7.0		7.8		78			4.7	7.7	-
	DO (mg/L)	,			6,9		48			7.0	6.4	6
	Conductivity	×	×	×	330/	Х	X	Х	X	X	320	1
12591	T (°C)		•		•					ومراساتها	rd U1	F
	рН		7.7		7.6		h	, P. 1 8	مام،در	O SULV	1015	
	DO (mg/L)		7.8		7.1	Red.	77783	7777	24	(,		Γ
	Conductivity	×	X	×	310/	X	X	X	Х	Х	34	
12592	T (°C)											
	рН		7.8		7.8		7.8			7.8	7.8	1
	DO (mg/L)		7.6		67		7.1			7.2	6.8	G
	Conductivity	X	X	X	320	X	X	X	Х	Х	320	;
	Init./Date (1999):	19/34	1141	1/1/2	11/3	11/4,	11/5	11/6	11/2	13/8	448	1

Comments: Measured temperature is a measurement of a representative beaker placed within the text array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 29, 40, and end of test.

Review: Date: 12/22/49

	e-Cura & Associates				ad Creel		of Ana			st Start		
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	Τ
12593	T (°C)	39	7.9-	7			<u> </u>					+
	рН 🗹	911	7115		78		7.9			79	7.9	17
	DO (mg/L)		Z/		6.8		69			7.0	6.5	4
	Conductivity	Х	Х	Х	330	Х	X	Х	Х	X	340	1
12609	T (°C)					-						†
	рН		7.6		7.5		7.6			7.2	7.4	-
	DO (mg/L)		6.5		5.7		6.8			6,5	5.2	2
	Conductivity	Х	Х	Х	330	Х	X	X	Х	Х	330	T
12610	T (°C)											Γ
	pH		7.7	_	7.8		7.7			7,7	7.7	7
	DO (mg/L)		67		6.6		65			6,5	6.4	5
	Conductivity	Х	X	Х	320/	Х	X	Х	Х	X	330	
12615	T (°C)											
	рН		7.8		78		78			7.8	7.8	7
	DO (mg/L)		7.7		7.5		7.6			7.7	7.4	. :
	Conductivity	Х	Х	Х	310	X	X,	Х	X	X	325	1
	Init./Date (1999):	19/31	11/2-	11/2	11/3	11/4	11/5	11/6	12/7	11/8	11/9	1

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14; 28; 40; and end of test.

Review: \_\_\_\_\_\_ Date: \_/2/22/99 haenvchr.doc

oct: Menzie	e-Cura & Associates	Pro	ject: 99	033 De	ad Cree		of Ana	BTR: 36	22 168	t Start	10/20/9	9
						Day	OI Ana	ysis		i		•
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	3
12589	T (°C)		33.35	22.53	2307	3234	37,3	22.20	33/29	227	22.59	231
	pH		1.8	33.7		7.9	\ \ <del>\</del> \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	79	<del>~ /p~</del>	8.0		
	DO (mg/L)		7.2			7.5		75		8,36		
	Conductivity	×	X	X	×	X	X	300	X	X		,
12590	T (°C)				32.5							
	pH		7,8			7.9		7.9	, ·	80	processes and the contract of	**************************************
	DO (mg/L)		7.3			7.3		7.4	-	1		
	Conductivity	х	X	×	X	X	. X	300	X	\$ <u>/</u> _	×	,
12591	T (°C)											
	рН			-	-		-					
	DO (mg/L)							<b></b>				
	Conductivity	×	X	X	X	X	X	-	Х	X	X	,
12592	T (°C)			<u> </u>								
	pH		7.9			7.9		79		7.9		
	DO (mg/L)		7.4			7.4		7.4		8,0		
	Conductivity	X	X	X	X	X	X	310/	X	X	X	
	Init./Date (1999):	1//11	1413	11/13	12/24	11/15	11/16	11/17	11/18	11/19	11/20	111

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Review: Date: /2/21/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

- (

	e-Cura & Associates					Day	of Anal	lysis				9
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	3
12593	T (°C)	22.1	1									+-
	рН		7.9			7.9		7.9		7.9		
	DO (mg/L)		7.5			7.7		7.6		79		<del>                                     </del>
	Conductivity	Х	Х	Х	Х	X	Х	300/	X	X		1
12609	T (°C)	221/227										
	рН		7.6			7.6		7.6		7.9		
	DO (mg/L)		6.6			6.3		6,4		8.0		
	Conductivity	Х	X	Х	Х	X	Х	310	Х	X	Х	
12610	T (°C)											
	рН		7.8			7.7	<del>-,:</del>	7.7		7,9		
	DO (mg/L)		72			7.0		6,9		8.0		
	Conductivity	Х	X	Х	Х	X	Х	300	Х	Х	Х	7
12615	T (°C)											
	рН		79			7.9		7.9		8.0		
	DO (mg/L)		7.4			7.7		7.7	,	8.0		
	Conductivity	X	X	Х	Х	X	Х	310	Х	X	Х	
<del></del>	Init./Date (1999):	1///1	11/12	13/13	13/14	1145	11/16(	1417	11/18	11/19	11/20	1/1/

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Review: Date: n/u/go

						Day	of Anal	ysis				
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	
12589	T (°C)	23.7	か <u>火</u>	3,50	23.8	33,72,7	22:30	229	12.70	23.7	22.9	
	pH	8.0	A	80		78'	22.9	A CO	730	76.	7.7	
	DO (mg/L)	8,3	84	8.3		8.2			8.4	127	74	
	Conductivity	X	×	17/	×	X	×	×	l' x'	x'	270	
12590	T (°C)			<del>,</del>							1 / 0	-
	рН	8.0		7.9		7.8			7.9		7.7	
	DO (mg/L)	8,4		8.2		8.2		i i	8.3	7/100	15 7.5	-
	Conductivity	×	×	nop	X	X	×	×	Х	Х	280	-
12591	T (°C)			<del> /</del>						,	<del>  ``</del>	-
	pH ,	8.036	+				41					
	DO (mg/L)	8 4 20		800	d	/		-	815			一
	Conductivity	X	X	Kora	[ x	x `	×	×	×	×		
12592	T (°C)			<del> </del>							<del>  \</del>	
	рН	8.0		7.9		7.8		}	7.9	}	7.6	
	DO (mg/L)	8.24	6	7.8	-	8.1			8.3		7.0	
	Conductivity	\ X	x ,	99/	×	X	×	×	X	X	280	
	Init./Date (1999):	1,1/22	1,1/23	11/24	11/25	11/26	11/27	1//28	14/29	11/30	12/1	-

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of lest.

Review: Date: 12/22/99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

1

roject: Menzie	oject: Menzie-Cura & Associates			033 De	ad Cree				622 Tes	t Start	10/20/99	9
						Day	of Ana	lysis				
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	
12593	T (°C)											
	pH	810		78		78			7.9		7.7	
	DO (mg/L)	8,3		8.3		8.2			8,3		7,4	
	Conductivity	X	Х	250/	- X	X	Х	X	Х	Х	280	
12609	T (°C)			,								
	рН	90,0		79		7.8			7.9		7.7	
	DO (mg/L)	8,2		8.3		8.2			8,3		7.2	
	Conductivity	X	X a	280/2	Х	Х	Х	X	Х	Х	290	
12610	T (°C)											
	pH	8.0		7.9		7.7			7.8		7.7	
	DO (mg/L)	8,3		82		8.1			8,3		7.5	
	Conductivity	Х	Х	189V	X	X	Х	Х	X	X	280	
12615	T (°C)											}
	pH	8,0		79		7.8			7.8		7.7	
	DO (mg/L)	8.4		8,2		8.2			8,2		7.5	
	Conductivity	X	X	280%	Х	×\	Х	Х	Х	Х	280	
	Init./Date (1999):	1.1/23	11/23 Cc	11/24	1425	11/26	11/27	11/28	14/28	11/30	12/m	

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Date: 12/22/59

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3629 / 3633

Test Start: October 21, 1999 Day 28: November 18, 1999

			1	Test Star	t: Octobe	er 21, 199	9 Day	28: Nov	ember 18,	1999
Sample	Repl.	# Alive	11/16/99 Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12611	Α	(0	Tm	1(2)	Tiks	7		-	-	Reein
	В	R	LS	D	J'/18	В	-		-	Con
-	Cita	Ž	RB	O	T "23	2	-	-	-	
	D	8	Per		_	8	-			
	E	9	0		_	9	-	-	-	
	F	0	J			0	-	-		
	G	4	J	0	J	4		-		
	Н	10 100	T	0	0 1/19	×10	<u>-</u>	-	<u>-</u>	
	1	6	RB	0	364/27	6	4	27.67	25.83	
	<u>J</u>	749				9	9	₹1 EE	25.52	
	K	8	Tho			8	8	22.23	25,87	i
	L	9	POD			9	9	22.99	28.91	
12612	Α	4	RB			9	-	-	-	1
	В	4	T			9	-	-	-	
	С	10				10	-	-	-	
	D	7	RB			7	-	•	-	
	Ε	10	75		~	70	-	-	-	
	F	8	RB			8	-	-	-	
	G	ID	ĹS			10	•	-	-	
	Н	_10	KÈ			10	-	-	-	
	1	9	$\sigma$			9	9	2591	31.50	
	J	10	<u>IS</u>			13	10	24.29	29,39	
	K	) 2	RB.				10	24.46	31.13	
	<u> </u>	10	RB			10	10	22 78	28.57	
12613	Α	10	RB			.5	-	-	-	
	B	jo	LS			00	-	_	-	
	C	96	J	0	T '	D 49	-	-	-	
	D	9	iS			, 9		-	-	
	D E F	9				<u></u> 5 <sup>J</sup>	-	_		
	<u>F</u>	8	Par			?	-	-	•	
	G	<u>8</u>	Pra			_8	-	· <u>-</u>	<u> </u>	
	<u>H</u>	_8_	LS	0	1 1/18	8	<u> </u>		<u> </u>	
	1	9	<u> </u>			9	9	33.CI	27.24	
	J	<u> </u>	_/\$_			<u> </u>	9	22.76	30.78	
	K	<u> 10</u>	_رکن_			12	10	22 46	24.06	
	<u> </u>	_8	PLO			3	8	25.19	36,08	
Balance C		al (20 mg =			20 mg = 30		Balance A		1-2-7	
Comments	Organis	€Temp(°C ms in Replica	ites A - H trai	nt. TM	ater only exp	osure Oma	8.00 Temp	licates I - I	Init:	analysis
					wor ve				/	
		.3/55	10 (2) -	. 1 1		•	$\sigma$		$\sigma$	

Reviewer \_\_\_\_ Date 14246 (2) those found 2T repick not included in hacay28 doc Laboratory. Aquatec Biological Sciences. South Burlington. Vermont reproductive 255ESS neat (They were preserved)

000119

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3629 / 3633
Test Start: October 21, 1999 Day 28: November 18, 1999

Sample	Repl.	# Alive	11/16/99 Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12614	Α	10	-LS			_10	-	. <u>-</u>	-	
	В	9		(	_	9	-	-	-	
	С	9	RR			O	-	-	-	l
l	D	5	LS	(		9	-	-	_	l
	Е	0	LS			10		•	-	
	F	9	RB	}	1	9	-	-	-	
	G	10	J			\ 0			_	
	Н	10	J		—	/0	-	-	-	
	1	U	RS	)	-	10	10	21.38	26.76	
	J	io	0	_		70	10	22.60	26,00	
	K	8	RB	_	1	8	Vo	23.07	27.05	
	L	10	15			10	0	24.53	29.57	
12622	Α	2		0		2				
12022	В		Tm	0	Tr/23	2	-	-		
	С	2	Tm	00	127	9			<del>-</del>	
	D	<del>-7</del>	- ()	0		8	<u>-</u>	-		
1	E	<u>ੈ</u>	7m	- 0		2		<u> </u>	- <u>-</u>	
1	F		O m	10 /s	011/18 1/23	8	-			
		87 9587		<del>/-</del>	1/18 123		-		-	
lacksquare	Н	50 JT	Th	0	0.1/23	5	-		<u>-</u>	
		1	111)	~	<del>- 1</del>	1	,	24.40		
	j	a	LS	0	_	9	9	24.02	24.76 28.06	
	K	7	12	$\mathcal{O}$		5	6	23.44	27.07	
	L				<del>- 1</del>		6	<del></del>	26.70	
<u> </u>	- }	6				(2	٩	5.0.11	J-6. 70	
12638	Α	4	کیا	0	J 1/23	4	-	-	-	
ł	В	7				7	-			
	С	10	25				-	-	-	
	D	9	45			9		<u> </u>	-	
	E	q				9	-		-	
	F	\$	9	<u> </u>		\$	-		-	
	G	9	()			9	-	<u>-</u>	-	
	H	٧	1	19654	J	6	-	<del>-</del>	-	÷
	1	_10	(ag			10	10	20.52		
	J	10	J			<i>ا</i> ن	10	21.56	26.96	
	K	8	25	0	5 1/18	8	8	22.80	27,70	
	L	8	PO			8	8	23.32	28.59	
Balance (		ial (20 mg =			20 mg = ටුට		Balance As		le:4	
Date/time		1 <sub>30</sub> Temp(°C	tes A - H train	nit. TM	Date/tim		Temp(		Init.	analysis
omment	s. Organis	ms in Replica			aler only exp		manns in Rep	incates 1 - L l	o dry weight a	ariarysis.

Reviewer: \_\_\_\_\_ Date: 12/22/99. @ Died during Sieung J1/18/89 Only 7 Continued for haday28.doc
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont 255855 mens

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3629 / 3633
	Test Start: October 21, 1999	Day 28: November 18, 1999

Sample	Repl.	# Alive	11/16/99 Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12639	Α	10	0		. –	10	-	-		]
	В	8	ک	0	or "hs	В	-	-	-	
	С	9	LS			9		<u> </u>		•
	D	8945	LSIS			89B	<u> </u>	<u> </u>	<u> </u>	1
	E	9	J			9		-		
	F	0	RB			10		-	-	l
	G	8	+00			8	<u> </u>	<u> </u>		]
	H	10	tro			10	<u> </u>		-	}
•	1	<u>X</u>	72	0	1/8	8	8	21.79	36.42	1
	J	9	-0		· —	9	9	23.94	30.98	]
	K	10	PCO			10	10	36.61	32.88	1
	L	10				10	10	24.90	30.59	l
12640	Α	4	レン	0	8/11	8		-	-	
	В	9	J			9			-	}
!	С	<b>g</b>	TM	, Q	011/23	9			-	
!	D	9	J/RS			9	-	-	-	ł
	E	9	KB:			9	-	-		
	F	4'	RB			g	-			
	G	₽			<u> </u>	र्छ	-	-	<del>-</del>	 
	H	10	RB			10	-			·
	<u> </u>	_10	Pip			10	10	24.65	30,61	l
٦ . و	J	10	R.B.	<del></del>		10	10	3467	29.04	
Tank	<u>'N</u>		FUE			<del></del>		32.24	26.68	
	L	10				/0	10	35.07	30.55	
12641	Α	9	J			9	-	<u> </u>	-	
!	B 📞	10	RS	<u> </u>		10	-	-	-	
	<u>C</u>	10	_ <u>L&gt;</u> _			10	-	<u> </u>	! <u>-</u>	
	D E F	10	0,			/0_	<u> </u>	<u> </u>		ļ
	<u>E</u>	9	<del>-12</del>			_9_	<u> </u>		-	1
	F .	7	$\frac{L}{0.2}$	_0	5940	<del></del>	<u> </u>	-		
	G	3	RR			8	-	<u> </u>		)
	H	8	<del>- }</del> -			8	-		-0 00	1
	1	10	17:5			-18	10	22.53	38.33	-
	K	9	1m			9	9	31.80	24.97	
	1	3	Tm.			8	8	31.91	31.88	1
Balance C	C. Init	al (20 mg =	30 5- 1	Final C	20 mg = 💢 C		Balance A		21.90	<u> </u>
Date/time	In # 34 19	39Temp(°C	) S', Ir	nit 777	Date/tim	e out	Temp	(°C)	Init.	
			tes A - ⊟ trar		ater only exp		nisms in Rep	olicates I - L	to dry weight	analysis.

Revener Date 142495 included in reproduction 255015 ment. of

## Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3622 3629

Test Start: 10/21/99 Test End: 12/02/99

/ 			y 35 :5/99)				Day (12/0				
Sample	Rep	# Adults	# Neona tes	# Adults	# Femal es	# Males	# Neona tes	# Weighed	Init Pan Wt.	Total Dry Wt.	
12611	Α	4	0	4	3	(.	a	4	27,332	29,05	
	В	588	8	8	<u> </u>	à	43	8	25.013	28.43	
	С	2		Ī	0	1	0	1	25.533	26,11	1
	D	7	0	6	3	3	S	6	26,306	28,31	1
	E	91	5	9	7	2	21	9	25.097	28,25	records
	F					<del></del> _		<u>,</u> Q	25.778	28.60,45	in maran
	G	4		4	2	2	4	4	26.682		اعتداء
	Н	8	7	8	4	4	23	8	24.587	27.42	ļ
12612	Α	8	6	8	3	5	8	8	24.605	27.68	1
	В	8 8	93	7	4	3	17	_ 3	24.799	27.58	
	С	10	9	68	<b>2</b> 3	45	13	8	26.645	28.97	1
	D	0	2	6	2	4	2	6_	24.786.	28.03.	
	E	10	11	10	4	6	7	10	26.571	30,43	į
	F	8	7	8	4	4	<u>_</u>	8	26.143	28.98	1
,	G H	10	5	5-5	4	5	6	9	27.594	30,71	}
		10	5	10	4	G	7	18	26.377	29.82	ł
12613	Α	8	3	Ce	4	ス	[3]	6	24.816	26.98	
	В	10		10	4	G	15	10	25.583	29.29	1
	С	9	8000	9	8	1	16	9	26,069	29.16	
	D	9		9	3	6	12	9	26.563	30,03	<u> </u>
	E F	W 5 4	-?-	3	- [-	2	4	3	24.406	26,37	l
	G	8	4	8	5	3	16		26,978.	30.16	
	Н	ි 8	6	<del>۱۱۱رخ -</del>	3	54		8	26.186	30,79	ł
		0		87	~0 .)						
12614	<u>A</u>	7	3	9	5	4	21	9	26.740	29.96	Í
	В	9	<b>2</b> 5	9	3	6	8	9	28.546	31,16	{
	C	7		7	3	4	9	7	25.742	28.16	
	D	<del></del>	4	<u> </u>	5:	4	26	9	25353	28,97	ļ
	E	19	13	4	5	3	38	7	25.749	27.91	1
	G	10	12	10	7	4	222	10	27,982	27,25	
	H	8	3	7	a	5	6	7	24.503	26.45,	1
Day 35 In		<u> </u>		7	>		y 42 Initia		12/2/99 71		RB
Balance C	QC: Ir	itial (20 m	9=19.9			mg = 19		Balance	Asset #:		]
Date/time	In ala	18:00Temp	o(°C) 79	/ Init.	M	Date/tim	e outial3	K:00 Tem	p(°C) 80	Init.	+

Reviewer: Date: N2/49

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

100122

## Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3622 7024

Test Start: 10/21/99 Test End: 12/02/99

		Day (11/2	/ 35 5/99)		<del></del>			42 2/99)		
Sample	Rep	# Adults	# Neona tes	# Adults	# Femal es	# Males	# Neona tes	# Weighed	Init Pan Wt.	Total Dry Wt.
12622	Α	2	0		0	1	10		22.130	22.55
	В	2	0	2	l	1_	4	2	25.225	25,84
	C	#	8_	Œ	7	4	7	6	24.547	26,47
	D	12	4		0		0	l	26.115	26,60
	E		0	1	0	1	0	1	23.665	24.18
	F	5	4	5	2	3	8	5	86.575	28.14
	G	10	5	<u>(c</u>	2	4	6	6	210 10105	29.17
	Н	6	5	E	3	3	21	6	25.173	27,00
12638	Α	4	~ O.	4	7	3	3	4	26.413	28.99
	В	1,66	67	7	4		18	7	29.865	32.83
	С	10	3	9	5	3	20	8	27238	30.15
	D	9	ile	4	6	3	31	9	24.597	32.43
	E	8	(0_	8	4_	4	12	Ş	28.00%	30,82
	F	6	3	7	4_	3	13	7	25.913	28.64
	G	389	2	9	5	4	18	<u>q</u>	23.060	26,03
	Н	6	0_	5		4_	0	5	25.482	27.01
12639	Α	10	4	10	3	7	14	10	28.596	32.16
	В	8	3	8	3	5	14	8	26.543	29.87
	С	9	0	9	3	6	6	9	22.405	26.12
	D	る	(0)	7	3	4	13	7	25.689	28,41
i	E	9 ~	2	8	5	3	2-i	8	23.120	26,62
	F	10	2	9	2	7	5	9	25.003	28.36
	G	7	2	6	೩	4	12	6	25.459	287.99 JE
	Н	iC	4	j O	4	_6	9	10	22.961	26.57
12640	Α	7 " dad	T	7	2	5	7	7	29.192	33.16
	В	8	10	3	(0		25	8	27.939	30.64
	C	\(C	4	5	4		12	6	26.678	29.13
	D	8	8	3	3	5	14	8	26.494	30,50
	E	7 ' auen	10	7	5_	3	23	7	22.197	25.41
	F	407	多0	9	3		2	6	21.576	24.78
	G	85	4	\\ \dagger_{\text{s}}	5 m	3	9	8	24.356	27,25
	Н	3	3	57	<b>1</b> 3	4	12	8	27.203	30,48
Day 35 1:			1254	1/5			y 42 Initia	ls / Date:	12/2/99 7	
Balance (		itial (20 m		1 ,	Final (20	_ <u> </u>	<u> </u>		Asset #:	
Date/time	ב לכו חו	£ ocTemp	x°C) ₹	8 Init.	m	Date/tim	וויס au	3 <i>is:o</i> ₁Ten	np(°C) &v	Init. 3

Reviewer \_\_\_\_\_ Date \_\_\_\_\_12/12/65

#### Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3622 2629

Test Start: 10/21/99 Test End: 12/02/99

			Day 35 (11/25/99)		Day 35 Day 42 11/25/99) (12/02/99)						
Sample	Rep	# Adults	# Neona tes	# Adults	# Femal es	# Males	# Neona tes	# Weighed	Init Pan Wt.	Total Dry Wt.	
12641	A B C D E F G H	9997	0 \$89 0 7 3 1	98979587	3 6 4 4 5 3 7 4	G 2 5 3 4 2 3 3	12 22 28 19 14 57	9 9 9 9 7 7	24.390	20.62 28.81 30.51 25.68 26.55 26.69 27.86 28.09	
	A B C D E F G										
	A B C D F G H										
	A B C D E F G H										
Day 35 Initials / Date: 12   25   Day 42 Initials / Date: 12   29 m   Balance QC: Initial (20 mg = ) Final (20 mg = ) Balance Asset #:  Date/time In (2) 15 colored Temp(°C) 79 Init. The Date/time out Temp(°C) Init.											

Reviewer: \_\_\_\_\_ Date: 11/22/97

		Initial C	Ory Weight Data		
Replicate	# Weighed	Initial Boat Weight (mg)	Final Dry Weight (mg)	Mean Wt. within Rep (mg)	Mean Wt. Reps I-L (mg)
1	10	42.89	44.31	0.142	
2	9	42.23	43.57	0.149	
3	10	38.04	39.71	0.167	
4	10	36.93	38.64	0.171	
5	10	39.27	41.06	0.179	
6	10	<b>3</b> 7. <b>02</b>	38.70	0.168	
7	10	37.00	38.83	0.183	
8	10	39.69	41.36	0.167	0.166

### Hyalella azteca Initial Dry Wt.

Project: 4th set Chinic Age:

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)
1	10	42.892	44.31
2	ys 10 9	42.227	43.57
3	10	38.041	39.71
4	10	36.926	38.64
5	10	39.273	41.06
6	10	37.017	38.70
7	10	37. 003	38.83
8	10	39.685	41.36
Initials:			
Date:			

Balance QC: Initial (20 mg = / 9,96		Final (20 mg = /9.96	) Balance Asset #:	
Date/time In 12/4 10:55Temp(°C) &2°C	Init.	Date/time out /2	512:00 Temp(°C) 80	Init
Comments:		/		

Reviewer: Date: 122499
haintwt.doc
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

000136

#### Organism Holding and Acclimation

Species: Hyalella azteca	Date Received: 10/15/99 # Rec. 1000
Supplier. ARO	Hatch Date: 10/13/99
Apparent Conditon: Excellent	Culture ID: 10/13

Acclimation / Holding Procedures: Transfer to holding culture boxes, add laboratory water. Acclimate to water to be used for testing (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.

<u>Daily Feeding</u>: 1:1 mix of Selenastrum / YCT, 1-3 mL (maintain hint of green algal coloration on culture box bottom). Also, pinch of ground Tetrafin/Ceraphyll. Do not allow excess food/fungus to accumulate.

<u>Monitoring</u>: Examine over a light box daily, record apparent condition. Temperature daily; pH, D.O. on Mon., Weds., Fri., (miniumum). Conductivity weekly.

Test starts: record date, time, initials for sediment test and SRT test starts.

1999		-		1 20	Cond		Water		1
Date	Fed	Temp	рН	D.O.	uct		† Chg.	Age (Days)	Init.
10/15	VC3.	1/ 0		<del></del>	!		14464	7	1-0/
10/15	12070	16.0		!	<u>:</u>	<u>:</u>	rdaed	<u> </u>	136
10/16	W.Tcal	22.9			:			3	ME
10/10	10.501	(24-/		1	<u> </u>	<u> </u>		1 0	<u> </u>
10/17	Yckes	22.4	7.8	1.7	900		1	4	NG
	, <u>go.</u>		1	· 7. /	700	<del></del>	<u> </u>	<u> </u>	
10/18	Lembr	226		1	!		1 dded	5	+
									<del>-</del>
10/19	y'C'e!	22.7	· <del>-</del>	;	1			6	The
					<del></del>	-		·	
10/20		23.5	7.7	16.9	1800	1		7	KG
1001		74 N	7 7	17 4	. C A 4	<del> </del>		1.0	1600
10/21		27.0	<u> 7.7</u>	7.0	800		1	8	im
		i i					1	1	T
<del></del>				<del></del>	<u> </u>			1	<u> </u>
_				<u> </u>	:			1	
		<u> </u>		<del></del>		<u>;                                    </u>		<u> </u>	<del></del>
				ļ				<u> </u>	T
		·	· · · · ·		-	<del></del>	<del></del>	<del></del>	<u>.                                    </u>
	9			l		1	1		
_				ì	!		į		1

Sediment test start (Date/time/Init.)/0/1/99SRT test start: (Date/time/Init.)	



Organism History

## Aquatic Research Organisms

## DATA SHEET

	Species:	Hyglella QZTYCa
	Source:	Lab reared Hatchery reared Field collected
		Hatch date 10/13/99 Receipt date
		Lot number 1013 99 Hg Strain ARC
		Brood Origination USFWS MO
II.	Water Qua	lity
		Temperature 24 °C Salinity ppt DO 7.6
		pH $\frac{7.4}{}$ Hardness $\frac{2}{80}$ ppm
III.	Culture Co	nditions
		System: FW STATIC POJEWO!
		Diet: Flake Food Phytoplankton Trout Chow
		Brine Shrimp Rotifers Other
		Prophylactic Treatments:
		Comments: L 24 HRS OLD AT COLOCTION
IV.	Shipping I	
		Client: AUVATE VA BIOLOGICA of Organisms: 1600
1		Carrier: F(P) { Date Shipped: 10/14/99
10/15 36 10/15 Bio	ologist:	Atan Sintoli
16.00 C 36 16.00 C 36	19J	16/16 JG
16.00 A		1-800-927-1650 Teng=22,9°C
720	6 <sup>D</sup> P	DOX 12/1 - One Latavelle Noad - Trampion, 1411 03642 - (0031 920-1030
Cond 20	Ac GED 16	lded Sed. Nec. Hzo 10/17 JG 000128
Osiz	ru yc	T/Sel/c BO= 77 TED   Condi=900

#### · Organism Holding and Acclimation

Species: Hyalella azteca	Date Received: 10/15/99 # Rec. 1100
Supplier: ARO	Hatch Date: 10/14/99
Apparent Conditon: Excellent	Culture ID: 10/14

Acclimation / Holding Procedures: Transfer to holding culture boxes, add laboratory water. Acclimate to water to be used for testing (sediment overlying water formulation). Aerate lightly. Water change once (50%) weekly.

<u>Daily Feeding</u>: 1:1 mix of Selenastrum / YCT, 1-3 mL (maintain hint of green algal coloration on culture box bottom). Also, pinch of ground Tetrafin/Ceraphyll. Do not allow excess food/fungus to accumulate.

<u>Monitoring</u>: Examine over a light box daily, record apparent condition. Temperature daily; pH, D.O. on Mon., Weds., Fri., (miniumum). Conductivity weekly.

Test starts: record date, time, initials for sediment test and SRT test starts.

1999	į			Ī	Cond		Water		
Date	Fed	Temp	рН	D.O.	uct.		Chg.	Age (Days)	Init.
10/15	YED TO	16.0					phied	1	JG
							j: 1		
10/16	XCT	228		:			<u> </u>	2	12C
				<del></del> _				<u> </u>	
10/17	X J	122a.3	7.8	7.6	1/100	<u>_</u>	<u> </u>	3	KIG
							<del></del>		
10/18	Terrete	<i>3</i> 2,5		·	1		Added	4	10
	11 to annie	1 - A 1	_		<del>,                                      </del>				Hen .
10/19	YET DI	23.0					1	5	Th
10.00	ī	<del>, , , , , , , , , , , , , , , , , , , </del>			1 .	<del> </del>	,		<del></del>
10/20	<u> </u>	<u>i                                     </u>			11_		<del> </del>	6	<u> </u>
1001	lı .	12/10		60	:. ^ ^	<del></del> -		17	1-72
10/21	<u>!</u>	240	+.5	6.9	iiCC i		<u> </u>	1 /	17m
10/22	i	;		1	,		· · · · · ·	8	T
10/22	<u></u>	<u>! </u>		<u> </u>	1		<u> </u>	10	<u>-l</u>
	a :	1		:		<del></del>	7	<del>                                     </del>	$\overline{}$
	<u>:</u>	<u>:1</u>		<u> </u>	1	!	-	<u> </u>	
<del></del>		<u> </u>						g H	
	<u></u>	<u> </u>	<u>'                                    </u>	<del>!</del> -	<u> </u>	1		1	_!
	1			1		1	Ţ	1	<u> </u>
		, ,	<u> </u>		<u> </u>		<del>-i</del>	<u> </u>	<u> </u>
			_	1	; ;	1		1	1
	<del></del>	voear bea			and if any ob	<del></del>	<del></del>	·	<del></del>

• N = normal, appear healthy. Record # dead if any observed.

Sediment test start (Date/time/Init.)

\_\_\_SRT test start: (Date/time/init.) \_

10/23/99

Aquatec Biological Sciences South Burlington, Vermont haacclim.doc

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## Aquatic Research Organisms

## DATA SHEET

I.	Organism 1	History
1	Species:	Hyalella QZTYCa
	Source:	Lab reared Hatchery reared Field collected
		Hatch date 10/14/99 Receipt date
		Lot number 10 14 99 HA Strain ACO
		Brood Origination USFWS MO
II.	Water Qua	ality
		Temperature 24 °C Salinity ppt DO 7:6
		pH 7.4 Hardness=/80 ppm
III.	Culture Co	onditions
		System: FW STATIC PONEWA!
•		Diet: Flake Food Phytoplankton Trout Chow
		Brine Shrimp Rotifers Other
	•	Prophylactic Treatments:
		Comments: L 24 HRS OLD AT COLOCTION
IV	. Shipping l	
		Client: AUUATCH BIOLUACC# of Organisms: 1100 T
li5		Carrier: F(P) { Date Shipped: 10/14/99
101 36 1015 Bit	ologist:	Atom Sintalli
cived 10/15 36	9,08,3	70/16 JG
imb_ dil		1-800-927-1650 FES.
10-720	50 F	PO Box 1271 • One Lafavette Road • Hampton, NH 03842 • (603) 926-1650
Cond = 13:	<i>(()</i>	T= 33.3°C
$\circ$	トヒリ	YCT/Sel./TC Pho=cond=1,100 FED

			·			Day	of Ana			Test Sta		
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	•
12611	T (°C)	229	232 7	22.03	33019	1221	22 0	22 A	22.2	20.2	81.9	33
	рН	18	79	733.	-	79	A^.'.	7.8	74.1	7.8		3
	DO (mg/L)	7.0	7.1	_		7.4		7.2		6.2		
	Conductivity	360/	∤ ·x	×	×	x '	×	×	240	X	X	
12612	T (°C) '	22.7	21327				2833	319314	70.19.23	23.3	20.2	
	pН	7.9	8.0		_	7.9		7.8		79		
	DO (mg/L)	69	7-1	_		6.4 x		6.8		63		-
	Conductivity	100	×	×	×	X	×	X	325	X	X	
12613	T (°C)	22.7								223	27.2	
	рН	7.9	79	_	_	7.9		7.8		7.9		_
	DO (mg/L)	7.1	7.3			6.7		6.9		59		_
	Conductivity	350/	X	Х	Х	X	Х	X	335	X	X	,
12614	T'(°C) '''	2.77								223	22 12	
	рН	7.8	7.9		<b></b> ,	7:1		7.8		老9	<i></i>	
	DO (mg/L)	71	7.4	-	_	6,6		6.8		6.7		_
	Conductivity	350	X	X	X	X	X	X	305	X	X	
<del></del>	Init./Date (1999):	19/21	1,0/22 WV	10/23	10/24	10/25	19/26	1,9/27	10/28	10/29	10/30	1,0/

Review: 1 Date: 12/22/99

H. Dzkca added. 10/21/99 JG,

						Day	of Anal	ysis		- <b></b>		
Sample	Parameter	0	1	2	3	4	5	6	7	8	9	-
12622	T (°C)	22.7								20.3	225	
	pH	57.8	7.6	_		7.8	Zan	7.7	,	78		
	DO (mg/L) &	67	7.9	)	)	1765 X		7.6	,	6.2		_
	Conductivity	3595G	X	Х	Х	X	Х	Х	320	Х	X	
12638	T (°C)	227								22.3	22.1	
	рН	73	7.9			7.9		7.9		7.7		
	DO (mg/L)	8,03				7.1		6.9		69		
	Conductivity	360/	/ X	Х	Х	·X	Х	Х	310	Х	Х	
12639	T (°Ć')	23.2								22.5	22.6	
	рН	7.8	78			7.9		7.9		8,2		_
	DO (mg/L)	6.7	7.1			7.1		6.6		6.2		_
	Conductivity	350/v	×	Х	Χ	X'	Х	Х	310	Х	Х	
12640	T (°C)	23.3								22.1	21.9	
	рН	7.7	8.0			79		7.7		7.6		_
	DO (mg/L)	6.6	8.0			6.6		6.2		0,5		_
	Conductivity	350/	X	Х	Х	X	Х	Х	370	Х	X	
<u>.</u>	Init./Date (1999):	10/21	19/22	10/23	10/24	10/25	19/26	10/27	10/28	19/29	10/30	10/

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group. 28

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test

enter enter enter enter et enter et enter enter et enter et enter et enter et enter et enter et enter et enter	-Cura & Associates	<u> </u>			ad Cree		of Ana			Test Sta		
							, or Ama	., 513				
Sample	Parameter	0	1	2	3	4	5	6	7	8	\ 9	1
12641	T (°C)	22.7					<del>                                     </del>			23.0	U). 6/	
	pН	7.6	7.8		_	177		7.7		7.8		
	DO (mg/L)	63	74		_	17		59	<b>.</b>	5.8		-
	Conductivity	400/	) 'x	×	×	_,x,	×	x	390	X	X	,
<u>-</u>	T (°C)	,,,,,										
	pH	•	-				-					<del> </del>
	DO (mg/L)											<del> </del>
	Conductivity		X	X	X	X	_X_	X		X	X	-;
	T (°C)											1
	рН			1		1						
	DO (mg/L)				1		1	<del> </del>			-	
	Conductivity		X	X	X	X	X	X		X	X	;
	T (°C)						1	†		1		
	рН											
	DO (mg/L)											
	Conductivity		X	X	X	Х	X	X		X	Х	7
	Init./Date (1999):	19/21	10/22	10/23-	10/24	10/25	19/26	19/27	1.0/28	10/29	10/20	10/

Comments: Measured temperature is a measurement of adepresentative beaker placed within the test array for this testing group.

3. Comments: Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Review: Date: 12/22/59 haenvchr.doc

oject: Menzie	-Cura & Associates	Pro	ject: 99	033 De	ad Cree	<del></del>		BTR: 30	345 Tes	t Start	10/1/9/9	9
						Day	of Ana	lysis	-			
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	21
12611	T (°C)	231	21.3	3337.	71:04	10,4	21.4	22.2	22.0	22. <del>4</del>	22.0	a1.4 2
	рН	8,3		8,3		8,2	9/		8,4		8-3	ح _ ح
	DO (mg/L)	6,4		0,5		62			6.7		6.0	
	Conductivity At Amin	Χ	Х	Х	350	X	·X	X	Х	Х	330	Х
12612	T (°C) '		22.5					22.7		21.4	22.6	22.5
	рН	81		7.9		8,0			8.0		7.9	
	DO (mg/L)	6,8 x		6,6		ان ما			6,5		6.1	
	Conductivity √1+/†	Х	X	X	3/0	Х	Х	Х	Х	Х	315	X
12613	T (°C)	8.0-	) )									
	рН	6,96	-	8,0		83			8.3		8.4	
	DO (mg/L)	١		6.6		6.5			6.9		6.5	
	Conductivity	Х	Х	Х	310	Y	Х	Х	Х	Х	330	Х
12614	T (°C)											
	рН	8,0		8.1		82			8.7	7 8-6		
	DO (mg/L)	6,9 6	6.6		65			7.0		6.0		
	Conductivity	X	Х	Х	210	X	Х	Х	Х	Х	330/	Х
	Init./Date (1999):	14/2	14/7	11/3	11/4	11/5	11/62	14M	11/8	149	11/10	1/1/1

Comments: Measured temperature is a measurement of a representative beaker placed within the test arraydor this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Review: Date: 12/21/99

	-Cura & Associates	1119	,000. 0.	9033 De	00 0.00		of Ana		815 Tes	. 0.0		
			_			Day	OT ARE	iyais			8	
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	2
12622	T (°C)							<del>                                     </del>				
	рН	7.8	•	7.7		7.8			79		7.9	
	DO (mg/L)	7,2		7.0		7.8			7.4		7.3	
	Conductivity	Х	Х	X	330	Х	Х	Х	X	Х	320	>
12638	T (°C)											
	pH	7.9		8.0		8.4			8,3		R.4	
	DO (mg/L)	7.0 x				6.3 ×		· · · · · · · · · · · · · · · · · · ·			5.9	
	Conductivity	X	X	6.5 x	590	X	X	X	6.6 X	X	330	>
12639	T (°C)											
	рН	8.3		8.3		85			8.6		8.2	
	DO (mg/L)	6.8		8.3 6.6 x					6.8		6.3	
	Conductivity	X	×	X	330	1. ¥	X	X	X	Х	350	,
12640	T (°C)					1						
	рН	7.6		7.7		×1.1			7.8		7.8	
	DO (mg/L)	6.7	-	7.7 6.9 X					6.8		6.4	
	Conductivity	×	×	X	345	1 × /	X	X	X	X	330	;
	Init./Date (1999):	1413	11/2 m	14/3	11/4	11/5	11/6	1/2	141/8	1.1/9	1448	11/

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 29, 49, and end of test-

Review: Date: 12/22/59 haenvchr.doc

## 000136

## Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

ect. Menzie	e-Cura & Associates	1,10	ect. J	0033 De	ad Orce		of Ana		013 16:	Start	10/19/9	3
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	2
12641	T (°C)			,		,						
	pH	7.7		7.7		7.7			7.8		7-8	
	DO (mg/L)	2		5.9		6.0			6.1	<del> </del>	5.3	<del> </del>
	Conductivity	X	X	X	330	X	Х	X	X	X	340	X
	T (°C)											<del>                                     </del>
	рН											
	DO (mg/L)					<u> </u>				<del> </del>	<del> </del>	1
	Conductivity	Х	Х	X		X	X	X	X	X		X
		<del></del>										
	рН											
	DO (mg/L)											
	Conductivity	Х	Х	Х		Х	X	X	X	X		X
	T (°C)											
	Conductivity										<u> </u>	
											1	
	Conductivity	X	Х	Х		X	Х	Х	X	Х		>
····································	Init./Date (1999):	11/1	11/2	11/2	11/4	11/5	11/6	1/1/7	11/8	17/9	17/18	13/n

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Review: Date: 12/22/99

ject: Menzie	-Cura & Associates	Pro	joct: 99	033 De	ad Cree				329 / 33	Test St	art 10/	21/99
						Day	of Anal	ysis			<u>-</u>	
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	32
12611	T (°C)	21,89	22/2/3	21 7 3	21:8	21/1/8	22/00	32.16	24.0	22 4	23.9	22.7
	рН	8.1	30	,,,,	3.2	* / <i>‡</i> /;"	8.1	13 8	77.4	20	A-4-	7
	DO (mg/L)	7,2			7.2		1 / 0	27		<del></del>	<del>  _</del>	8.3
	Conductivity	X	×	×	X	X	6'8	7,30	X	X	~	21.
12612	T (°C)	<b>_</b>	 	11.40	1		}	2.9/			×	
	pH	80		11 12 1	70		79	1 33				C
	DO (mg/L)				7.9	-	111	1:0				8
	Conductivity	7,2 x	×	X	6,5		6.6.	567	/ x	×	×	\&\
			^		^	^	^	310//	^		^	_ ^
12613	T (°C)											
	рН	8.3			8.2		8.1	-1.9				7
	DO (mg/L)	7.4			7.1		6,8	6.9				8,
	Conductivity	X	X	X	X	X	X	7.30//	X	Х	×	X
12614	T (°C)						1					
	рН	8.167			8.8		8.7	84.				8,
	DO (mg/L)	7.62	Ġ		6.6				,			8.
	Conductivity	X	X	X	X	X	X	350	X	X	X	X
	Init./Date (1999):	1413	11/13	13674	11/15	11/16	14/77	11/18	11/19	11/20	11/21	11/2

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 44, 21, 28, 35, and end-of-test.

Review: Date: /2/22/99 haenvchr.doc

ject: Menzie	-Cura & Associates	Pro	ject: 99	033 De	ad Cree			BTR: 36	529 / 33	Test St	art 10/	21/99
						Day	of Ana	ysis				
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	32
12622	T (°C)											
	pH	7,8			79		8,0	7.8				8,0
	DO (mg/L)	7.9			7.8		7,4	7.6				85
	Conductivity	X	Х	Х	Х	X	X	290/	Х	Х		X
12638	T (°C)							V17 V				
	pH	8.1			811		8.0	79				8.
	DO (mg/L)	7.0			7.1		7.1	62				8.4
	Conductivity	X	Х	Х	7.1 X	X		33	Х	Х	X	X
12639	T (°C)											
	рН	8,3			8.2		8.2	7.9				8,
	DO (mg/L)	7,2			7.2		6.8	69				8,6
•	Conductivity	X	Х	Х	X	Х	Х	32	Х	Х	Х	Х
12640	T (°C)						-					
	рН	7,8			7.9		7.9	7.7				7.0
	DO (mg/L)	7.1			7.1		69	69				8,1
	Conductivity	X	Х	Х	X	Х	X	290/	Х	Х	X	X
	Init./Date (1999):	11/12	11/13	13/14	11/15	11/16	1143	11/18	11/19	11/20	1/21	11/2

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 44, 21, 28, 35, and ond of text.

\_\_\_\_ Date: 12/22/99

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						Day	of Ana	lysis				
Sample 12641	Parameter	22	23	24	25	26	27	28	29	30	31	<b>\</b>
12641	T (°C)						<del> </del>					†
	pH	79			8.1		8.7	111	-			1-
	DO (mg/L)	7.9			8.1		8.2	1.7	-	<del> </del>		7
	Conductivity	X	X	x	X	X	6 1 7	. ,	x -	x		8
	T (°C)		<del> </del>			<del></del>		310/				+-
	pH									-		<del> </del>
	DO (mg/L)									<u> </u>	<u> </u>	
	Conductivity	X	×	×	×	X	x		×	X	X	-
					_ ^		<u> </u>		^			
	T (°C)									ļ	-	
	рН							_				
	DO (mg/L)											
	Conductivity	×_	X	X	X	Χ	Х		Х	Х	X	
	T (°C)											
	PH											
	DO (mg/L)								-			
	Conductivity	X	Х	X	X	X	Х		Х	X	X	
	Init./Date (1999):	11/12	11/13	12174	1,1/12	11/16	1417	11/18	11/19	11/20	11/21 1/M	11

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0,-14, 21, 28, 35, and end of test.

Review: Date: 12/22/99 haenvchr.doc

ject: Menzie	e-Cura & Associates	Pro	ject: 99	033 De	d Cree				329 / 33	Test St	art 10/2	21/99
						Day	of Anal	lysis			1	
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	
12611	T (°C)	m.7/3	24.1	22.7	3ry Mr	22:34	23,29	22.8	227	227	22.3	
	рН		8.0	8.0		0		7.9		7.8		
	DO (mg/L)		8.3	8.3	_			8,1		7.5	7.7	
	Conductivity	Х	. X	1	X	Х	Х	Х	Х	Х	265	
12611 T (°C)												
			82	8.0				7.9		7.7	7.7	
				8.2				.l		1	7.5	
12613		X	Х	270/	X	Х	X	Х	Х	Х	270	
12613				23.0								
	рН		79	7.9				7.9		7.7	7.7	
	DO (mg/L)			8.3						<u>L.</u>	76	
		Х	Х	275	X	Х	X	X	Х	X	280	
12614				22.7								
	рН		79	7.9						7.7	7.7	
			8,0	8.1	1	,		8.3		7.6	7.5	
	Conductivity	Х	Х	275/	/ X	X	Х	X	Х	X	280	
	Init./Date (1999):	11/23	11/24	1,1/25	11/26	11/27	11/28	11/29	11/30	12/1	17/2	

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

oject: Menzi	e-Cura & Associates	Pro	ject: 99	033 De	ad Cree	k		BTR: 3	629 / 33	Test St	art 10/2	21/99
						Day	of Ana	lysis				
Sample	Parameter	33	80 8.1 × 285 × × × × × × × × × × × × × × × × × × ×	42								
12622	T (°C)		22.7	22.6					1			
	рН		7.9	1				7.9		77	7.7	
	DO (mg/L)	K8.0	8.0	· ·				· · · · · · · · · · · · · · · · · · ·			7.4	
	Conductivity	×	X	L .	×	X	X	X	Х	X	280	
12638	T (°C)			1227								
	рН	<u> </u>	79					7.9		7.7	7.7	
	DO (mg/L) ,	8.7		8.0				8.4		7.6	7.5	
	Conductivity	Х	X	265/	×	X	X	Х	X	X	280	
12639	Ϯ (°Ć)			2.2.5								
	рН							7.9		76	7.6	
	DO (mg/L) U	8.1	81	80				8,4			7.3	
	Conductivity F)1/-//Try	X		280/	- X	X	X	X	X	X	285	
12640	T (°C)			22.5								
	pH		79	7.8	I MININE RACIONA					7.7	7.6	
	DO (mg/L)	7.8	7.8	8.1				8.3		1	7.3	
	Conductivity 1944/pmm	Х		23	X	X	X	X	X	X	285	
	Init./Date (1999):	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	17/17	1 <del>2/2</del>	

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Review: Date: /2/22/99 haenychr.doc

# 000142

## Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

ject: wenzie	e-Cura & Associates	1 -10	ject. 99	033 De	au Cree		of Ana	BTR: 3	029/33	rest St	art 10/	27/
						Day	or Ana	iysis				
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	
12641	T (°C)		am	22.5							}	-
	Нд		79	78				7.8		7.7	7.6	
	DO (mg/L)	8.00	6.8	8.2				8,2		7.4	74	
	Conductivity	X	Х	270	X	Х	X	Х	Х	Х	280	
	T (°C)											
	рН									<del> </del>		
	DO (mg/L)											
	Conductivity	Х	X		Х	Х	X	X	Х	X		
· <del></del>	T (°C)											
	рН											
	DO (mg/L)											
	Conductivity	Х	X		Х	X	X	Х	Х	Х		
	T (°C)											
	рН											
	DO (mg/L)											
	Conductivity	Х	X		X	X	Х	Х	Х	X		
<del></del>	Init./Date (1999):	11/23	11/24	11/25	11/26	11/27	11/28	11/28	11/30	17/1	12/2	

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Review: Date: 12/29/97

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3641

Test Start: October 22, 1999 Day 28: November 19, 1999

Sample	Repl.	# Alive	11/16/99 Init.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12664	Α	1-10	ILS			110	-	-	-	
,200.	В	10	-16-			10	-	-	-	
	C	9	70			9	-		-	
	D	116	25			15	-	-	_	
	E	19	LS			9	-	-	-	
	F	10	116	<del></del> ;		10	-	-	-	
	G	4	RB	0	RB	4	-	-	-	
	Н	4	RB			9	-	-	-	
]	1	9	76			9	9	22 26	26.98	
	J	9	is			9	9	33.88	27,13	
	K	9	IS			9	9	25 23	28,56	
	L	10	9			10	10	24.30	28.35	
12665	Α	10	-							
12003	$\frac{A}{B}$	10	<u>J</u>			10	<del>-</del> -			
		10	13					_		
	<u>n</u>	9				<del>-15)-</del>	<del>-</del>	_	-	
	D E F	8				8	-		-	
	F	7	<u> </u>			<del>- 5</del>	<u> </u>			
1	G	9	1/~			9	-	_	-	
	Н	7	<del></del>			7	-	-	-	
	T	9	JG-			9	9	22,47	27.44	
	J	8	σ			8	8	26 22	31,70	
	K	10	ČS		<del>.</del>	10	10	34 3C	32.13	
	L	10	LS			Gi	10	33.60	28,30	
12666	Α	4	<u> </u>			4		-	-	
	В	8	RB			.8	-	-		
	C	10	-16-			10	-	-	-	
	D	5	0	0	RB	5	-	-	-	
	D E F G	5		_	_	5	-	-	-	
	F	8	Tm			Ŕ	-	-	-	
	G	8	0			8		-	<del>-</del>	
	Н	1,9			RB	6	-	<u>-</u>	-	
		9	RB		_	9	9	25.63	29.91	
	J	5	15			2	5	<b>36</b> 53	30.26	
	K	8	RB			B	9	24 83	29.49	
	L	8	LS			8	8	25.24	30.43	
Balance CC Initial (20 mg = 30 00 ) Balance Asset #:										
Date/time In ###1? 3CTemp(°C) 81 Init 7M Date/time out Temp(°C) Init.										
Comments. Organisms in Replicates A - H. transferred to water only exposure. Organisms in Replicates I - L. to dry weight analysis.										

Reviewer Date 12/22/99
haday28 doc
Laboratory Aquatec Biological Sciences, South Burington, Vermon:

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3641

Test Start: October 22, 1999 Day 28: November 19, 1999

ample	Repl.	# Alive	11/16/99 Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.
2668	Α	5	JG	0	RB	5		-	-
	В	-8	76	4	RB	8	-	-	-
	С	10	RB			10		-	-
	D	7	76	0	RB_	7		-	-
	E	10	RB			10	-	-	-
	F	8	RB	0	RB	8	_		
	G	7_	LS	<b>-€</b>	RS-ES	T HES	-		-
	Н	3	J	Ø 69	P3 13	3		-	-
	1	_6	TM	0	RB	6	Q	25.87	29.55
	J	9	RB		~_	9	9	25.08	28.11
	K	8	J	0	RB	8	8		28,37
	L	7		0	RB_	7	7	24 69	28,03
2671	Α	10		6	RD	6	-	-	_
	В	9			-131	9	-	-	-
	С	110	LS		. —	(0)	-	-	_
	D	- <del>'</del> G	15			4	-	-	_
	E	G	7			9	-	-	_
	F	10	LS			1/5	-	-	_
	G	, Q				10	-	-	-
	Н	10	3			10	-	-	_
	1	9	JG	_		9	9	23.50	28.14
	J	G	195			(0	9	22.49	25.43
	К	X	LS			\$	8	26.25	29.96
	L	9	7/6			9	9	24.84	28.09
	^					7			
	A						-	-	-
	В							-	-
	C	<del></del>				<u> </u>		-	-
	D E						<u>-</u>	-	-
		<del></del>						-	
	F			·			<u>-</u>		<u> </u>
	G		<del> </del>				-	-	
	H			-				-	-
	1								-
	J								
	K	<del></del>			-				
<del></del>	L	1,000	20.00		20		<u> </u>		<u></u>
lance C		al (20 mg =			20 mg = کر Date/tim		Balance As		Init.
елите	111 11/29 )	7:30 Temp(°C	3/ 11	nit. 7m			Tempo nisms in Rep		

## Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3641

Test Start: 10/22/99 Test End: 12/03/99

Day 35 (11/26/99)				Day 42 (12/03/99)						
Sample	Rep	# Adults	# Neona tes	# Adults	# Femal es	# Males	# Neona tes	# Weighed	Init Pan Wt.	Total Dry Wt.
12664	Α	9	. 6	8	6	7	2	8	29.54	31.78
	В	10	2	9	5	4	10	9	26.05	29.02
•	C	9	3	8	3	5	7	8	27.56	30.32
	D	8_	11	8	4	4_	11	S	23,47	26,28
!	E	8	0	_ 8	2	086	1 1	8	27.84	31.00
	F	9	8	9	7	2_	089	9	78,82	32.11
	G	4	2	4	3		ن ن	4	26,37	28.21
	Н	9	4	9	5	4_	11	9	78,78	32.33
12665	Α	9	2	4	4	5	34	3)	24.60	29.03
<del>-</del>	B	11	12	11	4	7	21	11	27,27	31.53
	c	10	13	a	6	3	35	9	25.55	29.79
	D	9	3	8	4	4	19_	Š	25.62	29.65
	E	8	6	8	-5	3	8	\$	25.09	35.44
	E	7		7	3	4	25	7	23.39	28.12
	G	`S	3	6	5		7	(s	2737	30.85
	Н	6	6	9	3	3	10	S	27.28	28.50
12666	A	2		7	2			3	29.11	30.98
.2000	В	N. Se	6	8	6	2	9	S	23.50	27.15
	C	9	à.	10	5	5	3	10	23.21	26.96
	D	5	à	5	2	3	(e	5	24.64	20,16
	E	5	ī	5		2	i	5	28 74	.30.81
	F	7	10	7	7	-5	11	7	2562	28.55
	G	8	0	3	4	4	1	625 B	27.14	830-42
	Н	6	0	6	3	3	4	2	30.88	33. 77
12668	A	5	b L	524	(C )	7		REX	28,25	0- 110
12000	B	1	2	7/6	4	<del></del>	<del></del>	Buz	2ic 09	28.12
	C	8	7	8	<del>-3'-</del>	<del>-2</del> -	<del></del>	The sur	24.55	27 42
	D	2	-	4	<del>-</del> <del>4</del> -	Ö	10	16 7 3	25.97	211.72
	E	10	3	3	3	<u> </u>	2	بر سي ج	27.50	29.89
	F	ゴ	6	7	6	T	9	-	29.25	3007
	G	6	1	6			10	BUX	25:5	27.08
	Н	3	7	3		<u></u>	10	8 2 a	21.94	22.54
Day 35 In		Date: JC	3-11/26	199		Da	y 42 Initia	is / Date:	JG 12/3/79	B 48
Baiance C	DC Ir	intial (20 m	ng = 19.9	7		mg = 16	1.97	Balance	Asset#:	
	in nh	14-05 Temp	O(°C) S()	Init.	يحج –	Date/tim	ne סט: בן	em کار دیر ا	1p(°C) 809	nit. 📈

## Amphipod (*Hyalella azteca*) Chronic Toxicity Test Days 35 and 42 Survival, Reproduction, and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3641 Test Start: 10/22/99 Test End: 12/03/99 Day 42 Day 35 (11/26/99)(12/03/99)# # # Init Pan # **Total Dry** Neona # Femal # Neona Rep Weighed Wt. Sample Adults tes Adults es Males tes Wt. 1 2 2 12671 Α Ц 30-58 29,18 31.47 В 28.67  $\overline{\mathsf{c}}$ B2 4 27.45 10 25 24.3D 6 2 D 9 9 Ó 0 24.57 7 9 E 31.94 10 7 F 9 2 *2*5. 20 28,33 G 30.01 33.62  $\overline{\mathsf{H}}$ 27.14  $\mathcal{O}$ 24.77 Α В  $\overline{\mathsf{c}}$ D E F G H Α В  $\overline{\mathsf{c}}$ D E F G Η Α В C D E G RB Day 35 Initials / Date: Tell/26/99 Day 42 Initials / Date: Balance QC: Initial (20 mg = Final (20 mg = Balance Asset #: Temp(°C) Date/time out Temp(°C) Date/time In Init. Init.

Reviewer: \_\_\_\_\_\_ Date: 12/22/99 @ Correction of 12/3/99 had3542.doc

Initial Dry Weight Data										
Replicate	# Weighed	Initial Boat Weight (mg)	Final Dry Weight (mg)	Mean Wt. within Rep (mg)	<b>M</b> ean Wt. Reps I-L (mg)					
1	10	43.37	44.91	0.154						
2	10	37.51	39.16	0.165						
3	10	38.19	39.62	0.143						
4	10	37.15	38.72	0.157						
5	10	36.97	38.43	0.146						
6	10	41.48	42.74	0.126						
7	4	45.28	45.59	0.078						
8	10	46.18	47.71	0.153	0.140					

#### Hyalella azteca Initial Dry Wt.

Project: H 9. /0/22/99

Culture ID: 20+Ch 10/15/99

Age: 7

Replicate	Number of Organisms weighed	Initial Pan Weight (mg)	Final Pan Weight (mg)
1	10	43.346	44.91
2	10	37.510	39.16
3	10	38.186	39.62
4	10	37.147	38,72
5	10	36,969	38.43
6	10	41.477	42.74
7	y3 10 4	45-281	45.59
8	10	410. 184	47,71
Initials:			
Date:			

Balance QC: Initial (	20 mg = <i>i 9 , 9</i>	<b>(L</b> )	Final (2)	0 mg = 19,96	) Balance Asset #:	
Date/time In 12/4 10:50	emp(°C) &2	اnit.	48	Date/time out 13-/	5 12:00 Temp(°C) So	Init.√G
Comments:						

Reviewer: Date: 12/22/49

haintwt.doc / Laboratory: Aquatec Biological Sciences, South Burlington, Vermont



# Aquatic Research Organisms

#### DATA SHEET

I.	Organism	History
	Species:	Hyalulla azteca
	Source:	Lab reared
		Hatch date 10/15/99 Receipt date
		Lot number 101599HA Strain ARO
		Brood Origination USFALS, MO
Ш.	Water Qua	ality
		Temperature 24 °C Salinity ppt DO 76
		pH_7.5 Hardness_180 ppm
III.	Culture Co	onditions
		System: FW STATIC (CNEW)
		Diet: Flake Food Phytoplankton Trout Chow
Pic politi	124	Brine Shrimp Rotifers Other
N.C.	; 7. C	Prophylactic Treatments:
/ <b>/</b> · :		Comments: <u>L 24's 060</u>
IV.	Shipping I	nformation
		Client: AQUATICH VT. # of Organisms: 1000 +
		Client: HUATKUH VI. # of Organisms: 1000 f  Carrier: FCC EX  Date Shipped: 10/18/99
Bio	logist:	Sten Sentola
t start	_	THE STATE OF THE S
1123 194		1 - 800 - 927 - 1650
- 23 2	•	
= 30	P	O Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-(	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dea	Dead Creek	1		BTR: 36	3641 Tes	Test Start	10/22/99	
		i				Day	Day of Analysis	ysis				
Sample	Parameter	0	-	2	r -	4	2	9	7	8	6	9
12664	T (°C)	21.6	27:9	19.00	7)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2.5 0.56	0.46 0.46	3/	a Col	468	0.66
	Hd	8.0	(	<b>b</b> 1	5/		4.9		14	<b>a</b> [	8	107
	DO (mg/L)	49	1		0,7		4.0		00)	1		7
	Conductivity Ammonia/Att	380	×	×	×	×	×	×		×	×	×
12665	T (°C)	22.0							8	06.9		
	Hd	7.8	1	l	76		46		4.7	1	)	28
	DO (mg/L)	み	\	Ì	67		4.9		5.4			6,5
	Conductivity	\$\$\$ \$\$\$	×	×	×	×	×	×		×	×	×
12666	T (°C)	22.2							2, 12 2, 12 7, 22	31.7		
	Hd	4.4	(	(	7.4		7.4		7.4	1		75
	DO (mg/L)	J.0	\	\	67		1.4		4.4	1	1	13
	Conductivity	360/	×	×	×	×	×	×		×	×	×
12668	(O)	339							1.50			
	Hd	7.6	١	(	8.2		8.4		82	}	į	4,8
	DO (mg/L)	∞ `	١	_ \	7%		7.2		4.9	(	1	8.9
	Conductivity	350/	×	×	×	×	×	×		×	×	×
	Init./Date (1999):	19983	1083	1984	10/29	19/26 19/27	18/61	10/38/	5061	19/30	1000	11116
Comments: Measured	Comments: Measured temperature is a measu/ofment of a representative beaker placed within the Lest array for this testing group.	(Ament of	a represer	ntative bea	ker placed	s Within th	ellest arra	y for this t	esting gro	up.		
Measure D.O. and pH	Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.	ivity once	weekly. C	ollect amm	onia, alka	linity, and	hardness	sambles o	on Days 0	, 14, 20, 4(	o, and end	of test.
1	Date: 12/21/99	ý,	/34 hea	10/34 heater adjusted	ustad n	m 11206	Azobath to rava	م مرد	ty of	temp	<b>ら</b>	
) ser											** •	

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Review:

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haenvchr.doc

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

						Day	Day of Analysis	ysis				
Sample	Parameter	0	-	2	က	4	9	و	^	8	6	5
12671	T (°C)	لى. لار ال	<u> </u>						28.05 10.05 10.05		<u>.</u>	
	Ha	79	1	1	7		& ?:		\ (1) (1)	)	1	2
	DO (mg/L)	7.4	١	١	7.0		6.1		5.9		)	ق
	1	340	×	×	×	×	×	'×		×	×	×
	1 (°C)					_						
	Ha	: :	:						\	7		
	DO (mg/L)		i	:	: :	î I						:
	Conductivity	1	×	×	×	× \	X	×		×	×	×
	T (°C)											
	Hd			\						1	1	
	DO (mg/L)											
	Conductivity	_	×	×	×	×	×	×		×	×	×
	T (°C)											
	) Ad											
	DÓ (mg/L)							,				
	Conductivity		×	×	×	×	×	×		×	×	×
	Init./Date (1999):	1972	27	1924	10/25)	1978	19/2N	19/28	1923	<u>\$</u>	# P	<b>177</b>
Comments: Measured temperature is a measurement of a representative beaker placed Within the lest array for this testing group.	Comments: Measured temperature is a measurement of a representative beaker placed within the lest array for this testing group.	irement of	a represe	ntative be	aker place	d within th	e dest arra	v for this	testing aro	d D		

000151

-horatory: Aquatec Biological Sciences, South Burlington, Vermont.

Date: 12/22/99

Review: haenvchr.doc Amphipod (*Hyalella azteca*) Overlying Water Ehvironmental Monitoring: Chronic Toxicity Tests 3641

Sample Parameter 11 12 13 14 15 16 17 18 19  12664 T (°C) 224 224 225 224 225 224 226 226 224 226 226 224 226 226 224 226 226	Project: Menzie-C	Project: Menzie-Cura & Associates	Pro	Project: 99(	99033 De	Dead Creek	×		BTR: 3	3615 Tes	Test Start	10/19/99	
11							Day	of Ana	lysis	0		0	
113   114   115   118	Sample	Parameter	11	12	13	14	15	16	17	18	19	20	21
8,0 8,0 7,7 × × × × × × × × × × × × × × × × × ×	12664	(°C)	\	12.50	45	22.62	6.60	8:18	Se Se	5. 0.	120	12/2	0/9
7-13   11/5   11/6   11/16		Hd		8,0		, ×			8,0		5.4	4 7	C &
X		DO (mg/L)		47		2,00			けた		4	4.5	"
8,3 8,9 8,4 7.9    × × × × 3,2 × × × × × × × × × × × × × × × × × × ×		Conductivity	l	×	×	er er	×	×	×	×	×	310	0 : :
8,3 & & & & & & & & & & & & & & & & & & &	12665	(\$c)				13							
X       X		Hd		8,3		000			78.4		20	\chi	75
X   X   X   X   X   X   X   X   X   X		DO (mg/L)		0,9		2.0			0,1		4.9	5.6	けり
7.4 $7.4$		Conductivity	×	×	×	12/2	×	×	×	×	×	330	×
7.4	12666	T (°C)											
X X X X X X X X X X X X X X X X X X X		Hd		7.4		25					7.4	4.4	45
$\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$		DO (mg/L)		4,4		<u>3</u>			5.0		3.5	3.9	5,9
7.8 7.8 7.8 7.8 7.8 7.8 7.8 7.4 X X X X X X X X X X X X X X X X X X X		Conductivity	×	×	×	2/2	×	×	×	×	×	30/	×
78 $7.8$ $7.8$ $7.8$ $7.8$ $7.8$ $7.8$ $7.8$ $1.8$ $1.14$ $11.5$ $1.16$ $1.16$ $1.17$ $1.16$ $1.17$ $1.18$ $1.19$ $1.1$	12668	T (°C)											
$6.9$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$		Hd		78		7			43		87	7	79
11/2 11/3 11/4 11/5 11/8 11/7 11/8 11/9 11/9 11/9 fement of a representative beaker placed within the test array for this testing group.		DO (mg/L)				7.0			4		4.4	7.4	57
The 1113 1114 11/5 11/6 11/7 11/8 11/9 11/19 11/19 11/19 11/19 11/19 element of a representative beaker placed within the test array for this testing group.		Conductivity	×	×	×		×	×	×	×		300/	×
		Init./Date (1999):	13/18	113	11/4	11/5/	11/6	17/1/N	13/8	484	44	144	1982
	Comments: Measured	I temperature is a measu		a represer	tative bea	aker place	d Within th	e test arra	y for this t	esting gro	up.		

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Review: Date: It feet 7 has haven doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont 

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						Day S	Day of Analysis		Ĥ		\ <del>.</del>	
Sample	Paramoter	7	12	13	14	15	16	17	18	19	20	21
12671	T (°C)											
	Hd		8.5	de	<del>3</del> .			20°	8	~ ∞	0<0 (4)	مَن
	DO (mg/L)		7.0	3	, , ,			7	A N	5.9	5 %	n
	Conductivity	×	- - × }	×	المراج	×	×	×	×	×	13	×
	T (°C)											
	Ħ											
	DO (mg/L)					. <u></u>		· —				
	Conductivity	×	×	×		×	×\	/×	×	×		: <b>×</b>
	T (°C)											
	Hd											
	DO (mg/L)			/			<u>_</u> _	<u>-</u> ,				
	Conductivity	× `	X	×		×	×	×	×	<b>×</b>		×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×		×	×	×	×	×		×
	Init./Date (1999):	13/8	17(3)	11/4	11/5	11/6	1,1/7	1. 1. 1.	17%	17,438	13/63	11.13

000153

Review:
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Laharatory: Aquatec Biological Sciences, South Burlington, Vermont

- Date. 12/11/8

Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Sample Parameter 7  12664 T (°C)  PH  DO (mg/L)  Conductivity  Conductivity  Conductivity  DO (mg/L)  Conductivity  DO (mg/L)  DO (mg/L)  DO (mg/L)	22 23	4 % 8 8 8 8 9 8 9 8 9 8 9 8 9 9 8 9 9 9 9	35	26	100					
T (°C)  pH  DO (mg/L)  Conductivity  T (°C)  pH  DO (mg/L)  Conductivity  T (°C)  PH  DO (mg/L)  Conductivity	\( \frac{\psi}{\psi} \) \( \times \) \( \t	1/2 0 0 1/2 00	o'c'ec	8	7	28	- 29	30	31	32
DO (mg/L) Conductivity T (°C) PH DO (mg/L) Conductivity T (°C) PH DO (mg/L) Conductivity	×			200	2///0	2/2	0/2/2	4.50	23.7	23/43
DO (mg/L)  Conductivity  T (°C)  DO (mg/L)  Conductivity  T (°C)  pH  DO (mg/L)  Conductivity	×	0 × 6 0				5,	6		80	
Conductivity  T (°C)  PH  DO (mg/L)  Conductivity  T (°C)  PH  DO (mg/L)		× 60		70		9:6			83.3	
T (°C)  pH  DO (mg/L)  Conductivity  T (°C)  pH  DO (mg/L)		60	×	×	×	310/	×	×	X	×
DO (mg/L) Conductivity T (°C) pH DO (mg/L)		40								
DO (mg/L) Conductivity T (°C) pH DO (mg/L)		∞ •		83		ارم			8.0	
Conductivity  T (°C)  pH  DO (mg/L)				7.0		70			8,3	
T (°C) pH DO (mg/L)		×	×	×	×	240	×	×	×	×
		tt		7.7		7.6			8,0	
_		5.9		-10		0/183			8,7	
	×	×	×	×	×	1 (6)	×	×	×	×
12668 T (°C)										
Hd		49		478		7.7			8.0	
DO (mg/L)		2,8		4.4		75			8.4	
Conductivity	×	×	×	×	×	2 de	×	×	×	×
Init./Date (1999): 11/	1413 11/14	11/15	11/16	五	11/18	11/19	野	13/21	1188	11/33

000154

Review: Date: Jane Date: And Date: A

Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Sample	Parameter	22	23	24	25	78	27	78	29	30	31	32
12671	T (°C)											L
	Hď			4.8		48		78			67	
	DO (mg/L)			6.7		من ق		. <u> </u>			- X	
	Conductivity	×	×	:×	×	×	×	2000	×	×	X	×
	T (°C)	i !										
	Hd											
	DO (mg/L)								\			
	Conductivity	×	×	×	×	×	*	<b>.</b>	×	×	×	×
	T (°C)											
	H				\						-	_
	DO (mg/L)			\								
	Conductivity	X	×	×	×	×	×	; 	×	×	×	×
	T (°C)											
	Ha			<u>-</u>								
	(T/Bm) OQ			;						!		
	Conductivity	×	×	×	×	×	×	·	×	×	×	×
	Init./Date (1999):	11/13	17/14	11/165	11/16	11475	11/18/	11/10	11/20	13.12.1	138	41/23

Review: Date: 1422/99
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Lat rtory: Aquatec Biological Sciences, South Burlington, Vermont

Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-(	Project: Menzie-Cura & Associates	Pro	Project: 990	99033 Dea	Dead Creek	Ž		BTR: 3	3641 Tes	<b>Test Start</b>	10/22/99	
						Day	Day of Analysis	ysis			-	
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	
12664	T (°C)	Broke	42.00	1.00	22,26	14.4	Sich	0.28	45.00	13.00 CE 1	22,5	
	Hd	9,1		95	م و		6/5		7:7		48	
	DO (mg/L)	1,8		~~ %			1′8		4.8		49	
	Conductivity	×	×	200	×	×	×	×	×	×	230	
12665	T (°C)										23.0	
	Hď	79		6,			6't		7.6		7.8	
	DO (mg/L)	138		2.8			8,2		8.0		57	
	Conductivity	×	×	or C	×	×	×	×	×	×	240	
12666	T (°C)										22,5	
	Hd	2,		7.8			8 7 8		7-6		24	'
	DO (mg/L)	79		62.			6,8		42		35	
	Conductivity	×	×	970	×	×	×	×	×	×	290	
12668	T (°C)										325	
	Hd	9.		9.7			8'£		7.6		7.7	
	DO (mg/L)	6-2		79			8,3		1.1		7,5	
	Conductivity	×	×	24.0	×	×	×	×	×	×	290	
	Init./Date (1999):	11/24	11/PF	11/26	Bhì	17488	62/F1	08/11	12/1	13/6	123G	`
Comments: Measured	Comments: Measured temperature is a measur	rement of	ement of drepresentative beaker placed within the test array for this testing group.	ntative bea	aker place	d within th	e test arra	y for this t	esting gro	np.		

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 21, 28, 35, and end of test.

Review: Date: 16/64/69
haenvchr.doc Date: 16/64/69
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Amphipod (Hyalella azteca) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

						<b>P</b>		yais			
Sample	Parameter	33	34	35	36	37	38	39	9	14	42
12671	T (°C)										22.5
	Hď	P.(		79			4		7		4
	DO (mg/L)	300		9.(			8(3		4.4		43
	Conductivity	×	×	7,8 7.	×	×	×	×	×	×	188
	1 (°C)										-
	Hď					:		\			
	DO (mg/L)		:		•						
	Conductivity	×	×		× \	*	×	×	×	×	
	T (°C)										
	Hď			,	·						
	DO (mg/L)		/					!			
	Conductivity	×	×		×	×	×	×	×	×	
	T (°C)										
	, KQ						:				
	(J/Bm) Qa	1						1			
	Conductivity	×	×		×	×	×	† <b>:×</b>	×	×	<u> </u> 
	Init./Date (1999):	11/24	13/25	11/26	11/27	11/28	27	F. F.	125 255 255 255 255 255 255 255 255 255	1288	Jags Page

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( ) Date: 12/22/99

### ALKALINITY AND HARDNESS

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	Alkalinity (mg/l)	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
12546									
	10/19/99	50	0.2	2.3	42	50	0.1	11.6	230.0
	11/2/99	50	29.1	31	38	50	36	42.7	134.0
	11/8/99	50	22.9	24.4	30	30	37.8	41.1	110.0
	11/16/99	50	18.3	20	34	50	27.1	32.2	102.0
Avg					36.0				144.0
Min					30				102
Max					42				230
12547									
	10/19/99	50	2.3	4.6	46	30	11.6	17.7	203.3
	11/2/99	50	31	32.9	38	50	42.7	49.1	128.0
	11/8/99	50	24.4	26	32	30	41.1	44.2	103.3
	11/16/99	50	20	21.5	30	50	32.2	36.9	94.0
Avg					36.5				132.2
Min					30				94
Max					46				203
12548									
	10/19/99	50	4.6	6.9	46	50	17.7	26.8	182.0
	11/2/99	50	32.9	34.9	40	50	1.5	8.7	144.0
	11/8/99	50	26	28	40	30	44.2	47.8	120.0
	11/16/99	50	21.5	23.2	34	50	36.9	41.9	100.0
Avg					40.0				136.5
Min					34				100
Max 12540					46				182
12549	- 10 - 1- 1						<b>00</b> -	ac -	
	10/19/99	50	6.9	9.1	44	50	26.8	36.7	198.0
	11/2/99	50	34.9	37	42	50	8.7	15.9	144.0

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	-	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
	11/8/99	50	29 5	31 3	34	30	37	7	110.0
	11/16/99	50	23 2	24 7	30	50	4; ç	<b>46</b> 6	94 0
Avg					37.5				136.5
Min					32				94
Max					24				198
12550									
	10/19/99	50	<b>9</b> :	11 2	42	50	<b>35</b> 7	45.7	180.0
	11/2/99	50	37	38 9	35	50	15.9	23	142.0
	11/8/99	50	31 3	33	34	30	-	18.5	116 7
	11/16/99	50	24 -	26 2	30	50	€3	52	98 0
Avg					36 C				134.2
Min					35				39
Max					42				180
12551									
	10/19/99	5C	11.2	•34	24	50	D *	g	178.0
	11/2/99	50	38 9	40.8	38	<del>5</del> 0	23	30 3	146.0
	11/8/99	50	34 -	36 6	38	30	14.5	18.5	133 3
	11'1 <b>6/99</b>	50	25 2	27.8	32	50	5 2	194	104.0
Avg					3 <b>8</b> D				140.3
Min					32				104
Max					22				178
12552									
	10/19/99	5C	13.4	-5 9	50	50	g.	19 6	212 0
	11/2/99	<b>5</b> C	40 8	424	32	50	30 3	<b>3</b> 6 9	132.0
	11/8/99	5C	38 2	39 8	32	30	21 8	25 2	1133
	11/16/99	50	27 8	29 2	28	50	104	148	88.0
Avg					35 5				136 3
Min					28				88
Max					50				212

11/3/99 50 11.4 13.3 38 50 38.6 45.5 11 11/9/99 50 32.3 33.9 32 50 17 23.1 11 11/17/99 50 36.3 38.1 36 30 42.9 46.4 1  Avg	Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	-	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
11/3/99 50 11.4 13.3 38 50 38.6 45.5 11.1/9/99 50 32.3 33.9 32 50 17 23.1 11.1  Avg	12589									
Avg		10/20/99	50	22.5	24.3	36	50	14.8	20.6	116.0
Avg		11/3/99	50	11.4	13.3	38	50	38.6	45.5	138.0
Avg		11/9/99	50	32.3		32	50	17	23.1	122.0
Min Max 32 38 7  12590  10/20/99 50 24.3 26.1 36 50 20.6 26.6 13  11/3/99 50 13.3 15.1 36 50 0.3 7 13  11/9/99 50 33.9 35.3 28 50 23.1 28.8 1  11/17/99 50 38.1 41.1 60 30 0 33 0 3 3 1  Avg Min 28 70  Max 60 70  10/20/99 50 26.1 27.7 32 40 26.6 35 22  11/3/99 50 15.1 16.6 30 50 7 13.9 13  Avg Min 30 7 13.9 13  Avg Min 30 7 13.9 13  Avg Min 30 7 13.9 13  Avg Min 30 7 13.9 13  Avg Min 30 7 13.9 13  Avg Min 30 7 13.9 13		11/17/99	50	36.3	38.1	36	30	42.9	46.4	116.7
Max  12590  10/20/99 50 24.3 26.1 36 50 20.6 26.6 11  11/3/99 50 13.3 15.1 36 50 23.1 28.8 1  11/9/99 50 38.1 41.1 60 30 0 3.3 7  11/17/99 50 38.1 41.1 60 30 0 3.3 1  Avg  Min  Max  60  12591  10/20/99 50 26.1 27.7 32 40 26.6 35 2  11/3/99 50 15.1 16.6 30 50 7 13.9 13  Avg  Min  Max  28  12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1  11/3/99 50 16.6 18.5 38 50 13.9 20.9 1  11/3/99 50 35.3 36.7 28 50 28.8 34.3 1	Avg					35.5				123.2
10/20/99 50 24.3 26.1 36 50 20.6 26.6 11: 11/3/99 50 13.3 15.1 36 50 0.3 7 13: 11/9/99 50 33.9 35.3 28 50 23.1 28.8 1 11/17/99 50 38.1 41.1 60 30 0 30 0 3.3 1  Avg	Min					32				116
10/20/99 50 24.3 26.1 36 50 20.6 26.6 13 11/3/99 50 13.3 15.1 36 50 0.3 7 13 11/9/99 50 33.9 35.3 28 50 23.1 28.8 1 11/17/99 50 38.1 41.1 60 30 0 33 0 3 3 3 1  Avg 40.0 17  Min 28 10/20/99 50 26.1 27.7 32 40 26.6 35 2 11/3/99 50 15.1 16.6 30 50 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13  Avg 31.0 7 13.9 13	Max					38				138
11/3/99 50 13.3 15.1 36 50 0.3 7 13 11/9/99 50 33.9 35.3 28 50 23.1 28.8 1 11/17/99 50 38.1 41.1 60 30 0 3.3 1  Avg	12590									
11/9/99 50 33.9 35.3 28 50 23.1 28.8 1 11/17/99 50 38.1 41.1 60 30 0 3.3 1  Avg		10/20/99	50	24.3	26.1	36	50	20.6	26.6	120.0
Avg		11/3/99	50	13.3	15.1	36	50	0.3	7	134.0
Avg		11/9/99	50	33.9	35.3	28	50	23.1	28.8	114.0
Min 28 12591  10/20/99 50 26.1 27.7 32 40 26.6 35 2 11/3/99 50 15.1 16.6 30 50 7 13.9 13  Avg 31.0 17  Min 30 17  Max 32 2 2  12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1 11/3/99 50 16.6 18.5 38 50 13.9 20.9 11 11/9/99 50 35.3 36.7 28 50 28.8 34.3 1		11/17/99	50	38.1	41.1	60	30	0	3.3	110.0
Max  12591  10/20/99 50 26.1 27.7 32 40 26.6 35 2  11/3/99 50 15.1 16.6 30 50 7 13.9 13  Avg  Min  Max  30  12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1  11/3/99 50 16.6 18.5 38 50 13.9 20.9 1  11/9/99 50 35.3 36.7 28 50 28.8 34.3 1	Avg					40.0				119.5
10/20/99 50 26.1 27.7 32 40 26.6 35 2 11/3/99 50 15.1 16.6 30 50 7 13.9 13  Avg Min Max 30 12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1 11/3/99 50 16.6 18.5 38 50 13.9 20.9 11 11/9/99 50 35.3 36.7 28 50 28.8 34.3 1						28				110
10/20/99 50 26.1 27.7 32 40 26.6 35 2 11/3/99 50 15.1 16.6 30 50 7 13.9 13 Avg 31.0 17 Min 30 7 Max 32 2 2 12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1 11/3/99 50 16.6 18.5 38 50 13.9 20.9 1 11/9/99 50 35.3 36.7 28 50 28.8 34.3 1						60				134
Avg 31.0 50 7 13.9 13  Avg 31.0 7 13.9 17  Min 30 7 12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1 11/3/99 50 16.6 18.5 38 50 13.9 20.9 1 11/9/99 50 35.3 36.7 28 50 28.8 34.3 1	12591									
Avg 31.0 17  Min 30 71  Max 32 2  12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1  11/3/99 50 16.6 18.5 38 50 13.9 20.9 1  11/9/99 50 35.3 36.7 28 50 28.8 34.3 1		10/20/99	50	26.1	27.7	32	40	26.6	35	210.0
Min 30 17  Max 32 2  12592  10/20/99 50 27.7 29.4 34 20 35 37.3 1  11/3/99 50 16.6 18.5 38 50 13.9 20.9 1  11/9/99 50 35.3 36.7 28 50 28.8 34.3 1		11/3/99	50	15.1	16.6	30	50	7	13.9	138.0
Max     32       12592       10/20/99     50     27.7     29.4     34     20     35     37.3     1       11/3/99     50     16.6     18.5     38     50     13.9     20.9     1       11/9/99     50     35.3     36.7     28     50     28.8     34.3     1	Avg					31.0				174.0
12592       10/20/99     50     27.7     29.4     34     20     35     37.3     1       11/3/99     50     16.6     18.5     38     50     13.9     20.9     1       11/9/99     50     35.3     36.7     28     50     28.8     34.3     1										138
10/20/99     50     27.7     29.4     34     20     35     37.3     1       11/3/99     50     16.6     18.5     38     50     13.9     20.9     1       11/9/99     50     35.3     36.7     28     50     28.8     34.3     1						32				210
11/3/99     50     16.6     18.5     38     50     13.9     20.9     1       11/9/99     50     35.3     36.7     28     50     28.8     34.3     1	12592									
11/9/99 50 35.3 36.7 28 50 28.8 34.3 1		10/20/99	50	27.7	29.4	34	20	35	37.3	115.0
		11/3/99	50	16.6	18.5	38	50	13.9	20.9	140.0
11/17/99 50 41.1 42.8 34 30 3.3 6.7 1		11/9/99	50	35.3	36.7	28	50	28.8	34.3	110.0
		11/17/99	50	41.1	42.8	34	30	3.3	6.7	113.3

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	-	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
Avg					33 5				119.6
Min					28				110
Max 12593					38				140
12273	10/20/99	25	29 4	30 3	36	20	37 3	40 1	140.0
	11/3/99	50	18.5	20 1	32	40	20 9	27	152.5
	11/9/99	5C	36 <sup>-</sup>	38 1	28	50	34 3	40 5	124.0
	11/17/99	50	42 8	44 5	34	30	<b>£</b> 7	10	110.0
Avg					32 5				131 6
Min					28				110
Max					3€				153
22609									
	10/20/99	50	<b>3C</b> 3	32 3	40	<b>3</b> D	40 1	44.5	146 7
	11/3/99	50	20 1	22 1	40	50	27	34	140.0
	11/9/99	50	38 1	39 9	36	50	40.5	46 7	124.0
	11/17/99	50	44 5	46 4	38	30	19	13 4	113.3
Avg					38 5				131.0
Min					35				113
Max					43				147
32610									
	10/20/99	50	32 3	34 2	3.5	40	0.2	6.7	162.5
	11/3/99	50	22 1	24 1	40	50	34	41.1	142.0
	11/9/99	50	39 9	4. 2	32	50	6.5	64	116.0
	11/17/99	5C	46 4	48 2	36	30	13.4	169	116.7
Avg					36 5				134 3
Min					32				116
Max /26/1/					4 <i>0</i>				163
	10/21/99	50	2.4	2 5	44	50	<b>15</b> 7	24 3	172.0

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	Alkalinity (mg/l)	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
	11/10/99	50	8.9	10.3	28	50	19 4	27.1	154.0
	11/18/99	50	0.8	2.6	36	50	36.8	44.7	158.0
Avg					36.0				161.3
Min					28				154
Max					44				172
12612									
	10/21/99	50	2.6	4.5	38	50	24.3	32.4	162.0
	11/10/99	50	10.3	11.8	30	50	27.1	34.2	142.0
	11/18/99	50	2.6	4.2	32	50	0.2	7	136.0
Avg					33.3				146.7
Min					30				136
Max					38				162
12613									
	10/21/99	50	4.5	6.4	38	50	32.4	40.5	162.0
	11/10/99	50	11.8	13.4	32	50	34.2	40.1	118.0
	11/18/99	50	4.2	5.9	34	50	7	13.7	134.0
Avg					34.7				138.0
Min					32				118
Max					38				162
12614									
	10/21/99	50	6.4	8	32	50	0.1	8	158.0
	11/10/99	50	13.4	14.4	20	50	40.1	47.6	150.0
	11/18/99	50	5.9	7.9	40	50	13.7	21	146.0
Avg					30.7				151.3
Min					20				146
Max					40				158
12615									
	10/20/99	50	1.8	4.2	48	40	29.1	34.4	132.5
	11/3/99	50	31.4	33.1	34	50	23.1	29.5	128.0

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	-	Hardness Volume (mls)		Final Titrant	Hardness (mg l)
	11'9/99	50	47.6	48 8	24	50	33 3	38 8	110.0
	11/17/99	50	0.6	2	28	30	169	20.2	110.0
Avg					33 5				120 1
Min					24				110
Max					48				:33
12622									
	10/21/99	50	5	10 2	44	50	£	17.5	192.0
	11/10/99	<b>5</b> 0	144	:6	32	50	£ 3	- 2	126.0
	11/1 <b>8/99</b>	50	7 9	9 3	28	50	21	27 -	122 0
Avg					34 7				146 7
Min					28				122
Max					44				192
12638									
	10/21/99	50	10.2	12 1	38	50	17.5	25 3	154.0
	11/10/99	50	• •	17.5	30	50	7 2	:4 6	:48 C
	11/1 <b>8/99</b>	<b>5</b> C	9.3	10.9	32	50	27 -	33 5	128.0
Avg					33 3				143 <b>3</b>
Min					30				128
Max					38				154
12639									
	10/21/99	30	12 1	13.2	37	20	25 3	28.7	170 0
	11/10/99	50	17.5	19 1	32	50	14.5	22 4	156.0
	1.1/18/99	50	10 9	12.5	34	<b>5</b> 0	33 5	40 5	140 0
Avg					34 2				155.3
Min					32				140
Max					37				170
12640									
	10/21/99	50	13.2	14 5	32	50	28 7	37 E	182 0
	1.1.10/99	50	19 1	20 4	26	50	22 4	29	132 0

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	Alkalinity (mg/l)	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
	11/18/99	50	12.6	14.5	38	50	40.5	46.8	126.0
Avg					32.0				146.7
Min					26				126
Max					38				182
12641									
	10/21/99	50	14.8	16.9	42	50	37.8	46.5	174.0
	11/10/99	50	20.4	22	32	50	29	36	140.0
	11/18/99	50	14.5	16.2	34	50	0.4	7.3	138.0
Avg					36.0				150.7
Min					32				138
Max					42				174
12664									
	10/22/99	50	9.7	11.2	30	50	11.3	17.3	120.0
	11/5/99	50	42.4	44.1	34	50	18.3	23.9	112.0
	11/11/99	50	22	23.5	30	50	20.8	27.2	128.0
	11/19/99	50	16.2	18.4	44	50	7.3	14.8	150.0
Avg					34.5				127.5
Min					30				112
Max					44				150
12665									
	10/22/99	50	11.2	13.1	38	50	17.3	22.8	110.0
	11/5/99	50	44.1	46.1	40	50	23.9	30	122.0
	11/11/99	50	23.5	25	30	50	27.2	33.4	124.0
	11/19/99	50	18.4	20.2	36	50	14.8	22.5	154.0
Avg					36.0				127.5
Min					30				110
Max					40				154
12666									
	10/22/99	50	13.1	15	38	50	22.8	28.2	108.0

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	•	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
	11/5/99	50	<b>4</b> 6 :	47 9	36	50	D3	5 9	112 0
	11/11/99	50	26.8	28 3	30	50	40.8	46 S	122 0
	11/19/99	50	22 •	24 1	40	50	30.2	37 9	154.0
Avg					36 C				124 0
Min					3 <i>C</i>				108
Max					45				154
12669									
	10/22/99	50	•5	16 6	32	50	2E 2	33.1	98.0
	11/5/99	5C	4~ 9	49 5	32	50	5 5	10.9	100 0
	11/11 <b>/99</b>	<b>5</b> C	25 3	29 4	22	50	2.5	5.5	110.0
	1.1/1 <b>9/99</b>	<b>5</b> C	24 *	25 €	30	50	37.9	44 2	126.0
Avg					29 C				108.5
Min					22				98
Max 12671					32				126
	10/22/99	50	16.6	.83	34	5C	33 1	38	98.0
	11/5/99	50	z ·	: 8	34	50	10 5	7.7	122 0
	11/19/99	50	27.3	25 .	3€	50	€ E	14.8	156.0
Avg					34 7				125.3
Min					34				98
Max					36				156

Client: Manzy-Cura	Project:	99033	BTR:	3615
Sample Description: (	Day (	1019		

Sample   Sample   Sample   Sample   Sample   Sample   Sample   Data			· · · · · · · · ·	A L 1/ A		<del></del>	<del></del>	11400	NECC		Ī
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ID   Date   Vol.   Vol.   Init.   Vol.   Vol.   Init	Sample	Sample									
47 2.3 4.6 35M 11.6 17.7 48 4.6 6.9 50M 17.7 26.8 49 6.9 9 1 26.8 30.7 50 9 1 11.2 36.7 45.7 51 11.2 3.4 0.1 9.0			70				¥01.				
47 2.3 4.6 35M 11.6 17.7 48 4.6 6.9 50M 17.7 26.8 49 6.9 9 1 26.8 30.7 50 9 1 11.2 36.7 45.7 51 11.2 3.4 0.1 9.0	12546	10/19	5001	02	23	12/2 248	Find	01	11.10	12/7 48	1=/2148
48 4.6 6.9 50m1 17.7 26.8 49 6.9 9 1 26.8 30.7 50 9 1 11.2 30.7 45.7		<del></del>	1	23	77	1 (		11.10		1 1	1
50 9.1 11.2 30.7 45.7 51 11.2 B.4 0.1 9.0				410	109						
50 9.1 11.2 30.7 45.7	1 79				101		DOING		207		
51 11.2 3.4 0.1 9.0		1			71/2				157		
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12/8/99

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	Samp	le	Desc	ription	າ: 🗘	au 0	Н	. <i>O</i> .	10/2	Δ_		
			,			$\mathcal{O}_{-}$	نزي	inoni C			·	l
						LINITY			HARD			
	Sample ID		mple ate	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date! Init.	Data entered Init.
	12589	<i>i</i> :		5)ml	22.5	24.3	12/8 45	50m	14.8	20.6	GKY.	13/8/5
•	90		1		24.3	26.1		-	20.0	210.6		
1	G				2-1	27.7		HOM	26.6	35.0		
'	92		1-1		27.7	29.4		Zonl	35.Q	<u>37.3</u>		
•	193		-	25ml	294	<i>3</i> 0,3_		1 20 1	37.3	<u> 40.1</u>		
•	ialos 9		-	50 ru	2.3	32.3		30m	40.1	44.5		
•	410			<u> </u>	37.2	312 358		40my	0.2	G. +		
	1111		<del>                                     </del>		35 8	37 7 34 5	<del></del>	50ml	12.1	12.1	<del> </del>	
	u/3				37.5	30 2	<del></del>		17.7	236	<del></del>	
	أداني	_	<del></del> -	<del></del>	0.1	18	<del></del>		236	24.1	ì	
•	115		1		1.8	4.2	i	40 m	24.1	34,4		
	- 122	-			4.2	[c.]		50m	34.4	39. F		
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Client: Menae-Cura P	i Ojeci.	99033	DIA.	J6 29
Sample Description: (/)	au ()	Ha. 10/21		

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			ALKA	LINITY			HARD	NESS		
		Sample	Titrant	Titrant	Analyst	Sample	Titrant	Titrant	Analyst	Data
Sample	Sample	Vol.	Init.	Final	Date/	Vol.	Init.	Final	Date/	entered
ID	Date	50 1	Vol.	Vol.	Init.	<u> </u>	Vol.	Vol.	Init.	Init.
12/01/	10/21	50nJ	194		12/218	50ml	15.7	243	12/1 48	12/21/48
1 12	· }		12.6	14.5	<del>!                                    </del>		243	32.4		
13			<u> 14.5                                    </u>	10.4			.32.4	40.5	<u> </u>	
+14			10.4	<u> </u>	<del> </del>	<del>                                     </del>	Q.L	18.0		
12022			18.0	110.2			(X.O)	17.6		
<u>3</u> 8    39			10.2	112.1			Pt.C	25.3		
		30m	13.1	113.2	1 1	20d	25.3	28.7		
140		50mu	13.2	14.8	<u>:                                    </u>	50m)	28.7	37.8		
7 41	<i></i>		14.8	1/6.7	<u> </u>	_ل_	378	46.5	<u></u>	
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	Samp	le Desc	cription	<u>1:                                    </u>	ny (	<u>)                                    </u>					
											ı
					LINITY				NESS		
	Sample	Sample	Sample Vol.	Titrant Init_	Titrant Final	Analyst Date/	Sample Vol.	Titrant Init	Titrant Final	Analyst Date/	Data entered
	ID	Date		Voi	Vol.	Init.		Vol.	Vol.	Init.	Init.
	:2005	10/21	50m	is 1 7.6	7.6	FES	Don	0.5	6.1	Blogg	448
	121003			76	4.7			6.1	113		1
,				7.4			=-	712	1-10		
(	ialeur-	10/22	50ml	97	i1.2	<u>عز ۽ چا</u>	50ml	<u>//.ᢒ</u>	73.8	12/5/45	
,i. )	ايون الانتار		<del>  </del>		13.1		5	17:3	28.2		
Ha }	7 5			131	166			28.2	33.1		
thronk	15.00 %	1		16.6	18.3			33.1	38.0		1
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Client: Menzie Cura.	Project: C	79033	BTR:	Several
Sample Description:	Day 28	H.a.		

11.11.										
	elseate		ALKA	LINITY			HARD	NESS		
		Sample	Titrant	Titrant	Analyst	Sample	Titrant	Titrant	Analyst	Data
Sample ID	Sample Date	Vol.	Init. Vol.	Final Vol.	Date/ Init.	Vol.	Init. Vol.	Final Vol.	Date/ Init.	entered Init.
	1160%	50m l	18.3	20.0	12/8 2/8	50ml	27.	<i>32.</i> Z	12/8/48	12/AB
1 47		1	200	215	10 03	0114	32.2	36.9	10/9	10/140
48	<del>                                     </del>	<del></del>	215	23.2	<del>                                     </del>		30.9	41.9		<del></del>
49	1		23.7	247			41.9	40.6		
50			24 7	210.2			03	5.2		
51			26.2	20.2			5.2	10.4		1
- 52	上	1	27.8	292			10.4	14.8		1
			<u> </u>							
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ļ		<u>-</u> -		<del></del>	<u> </u>	<u> </u>	<u> </u>	<del> </del>	<u> </u>	
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ļ						<b>}</b>	<del> </del>	<del> </del>		
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<b> </b>						<b> </b>	<del> </del>	-	<u> </u>	
L				<u></u>	<u> </u>	<u></u>			}	

Client: Menzil Cura	Project:	99033	BTR:	Several	
Sample Description:	Day 28	Ha. + Ct	<u>-</u>		

			ALKA	LINITY			HARD	NESS		
	ample Date	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init.
	117	50ml	303			30ml		146.4		2012/8
90			381	41.1	1	i	0.0	3.3		170
12			i-	42.8	:		33	10.7		
1 43			42.8	44.5			6.7	10.0		
126091			44.5	46.4			10.0	13.4		
10			404	482	•		13.4	169		
I (5)	ユ		0.6	2.0			10.9	20.2	1	
1										
	17	50ml	<u>2.5</u>	3.6	113278	30ml	202		BLC Pi	lacksquare
112	1	-	36	<u> 53</u>	1	<del></del>	23 C	273	-	
13			53 69	53			27.3	31.4		<del>-  </del>
14	+				<u> </u>	<b>├</b> }	31.4	34.7	_	
<u> 1 22 </u>			85	<i>1</i> 0.1			34.7	37.8	+-	
- <u> </u>					<u> </u>		:	<del></del>	<u> </u>	<u> </u>
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Client: Munzie Cura Project: 99030 BTR: Several Sample Description: Day 28

					ALKA	LINITY			HARD	NESS		7
	Sample ID	Sample Date	Sam Vo		Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analys Date/ Init.	Data entered Init.
H.a.	12611	11/18	50 r	ml	0.8	2.6	18 1120	50ml	36.8	44,7	HOOL	
(	121012				2.6	4.2		1	0.2	7.0		
	12613				4.2	5.9			7.0	13.7		1 1
	12614		$\vdash$		5.9	7.9		<b> </b>	13.7	21.0		4-4-4
	12422				7.7	109		╂{	21.0	27.1		<del>       </del>
	12638 12639				93	12.6		<del>                                     </del>	27.1 33.5	335		<del></del>
	12640	-			12.0	145		<del>                                     </del>	40.5	46.8		1-1-1
\	12641	1			14.5	16.2			0.4	13		1-1-1
	12004	11/19			110.2	18.4			7.3	148		
	12445	11/19			18.4	20.2			14,8	22.5		
C.+	121115	11/18			20.2	22.1		<b> </b>	22.5	30.2		
H.a.		11/19			22.1	24.1		<del></del>	30.2	,37.9 44.2		1-1
	12668	11/18			25.6	25.60		<del>                                     </del>	37.9	6.8		
	12671	1119		- '	22 3	291	1	<del> </del>	6.8	14,6		1
		<del></del>								1.77.50		
					<u>-</u>						ļ —————	
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						<del></del>			<del> </del>		<u> </u>	
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								<del> </del>	<del>                                     </del>		<del>                                     </del>	1
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Sample Number	Client Sample Identifier	Species		Date		Ammonia Concentration	on (mg/l)	-
12546	BTOX-C-1	НА		16/19			14	
12546	BTOX-C-1	НА		11/16			0.2	
		Avç	3.6	Max	14	<b>M</b> in 02		
12547	BTOX-C-2	IN		10/19			62	
1254	BTOX-C-2	НА		11:16			D 7	
		Avg	3 45	Max	6 2	Min 07		
12548	BTOX-C-3	IN		15 19			4.5	
12548	STOX-C-3	HA		11.15			₽ €	
		Avg	2 35	Max	4 1	Min CE		
12549	ETOX-D-1	IN		10/19			17	
12549	BTOX-D-1	HA		1776			τ	
		Avg	C 85	Max	• 7	Min D		
12550	STOX-D-2	!N		-2 19			2 2	
12550	STOX-D-2	HA		11/16			٥	
		Avç	11	Max	2 2	Mm. D		
12551	STOX-D-3	IN		10119			15	
1255†	STOX-D-3	НА		11.16			ξ	
		Avç	0 75	Max	15	Mm. D		
-2552	HA LCS	IN		15:19			<b>32</b>	
12552	HA LCS	HA		11 16			Σ	
		Avg	c:	Max	C 2	Min D		
12589	BTOX-B-1	на		-526			DS	

Page 1 of 4

Sample Number	Client Sample Identifier	Species		Date	Ammonía Concentrati	on (mg/l)
12589	BTOX-B-1	НА		11/17		0.1
		Avg:	0.35	Max: 0.6	Min: 0.1	
12590	BTOX-B-1(DUPE)	НА		10/20		0.3
12590	BTOX-B-1(DUPE)	НА		11/17		0
		Avg:	0.15	Max: 0.3	Min: 0	
12592	BTOX-B-3	НА		11/17		0
12592	BTOX-B-3	НА		10/20		0.7
		Avg:	0.35	Max: 0.7	Min: 0	
12593	втох-м	НА		10/20		2
12593	втох-м	НА		11/17		0.1
		Avg:	1.05	Max: 2	Min: 0.1	
12609	E-1 DEAD CREEK	НА		11/17		0.4
12609	E-1 DEAD CREEK	НА		10/20		0
•		Avg:	0.2	Max: 0.4	Min: 0	
12610	E-2 DEAD CREEK	НА		11/17		0
12610	E-2 DEAD CREEK	НА		10/20		1.4
		Avg:	0.7	Max: 1.4	Min: 0	
12611	E-3 DEAD CREEK	НА		10/21		2.2
12611	E-3 DEAD CREEK	НА		11/18		0.1
		Avg:	1.15	Max: 2.2	Min: 0.1	
12612	BP-1 BORROW PIT	НА		11/18		0.1
12612	BP-1 BORROW PIT	НА		10/21		0.6

Page 2 of 4

Sample Number	Client Sample Identifier	Species		Date		Ammonia Concentrati	on (mg/l)
		Avg	0 35	Max	Dē	Min D1	
:2613	BP-1(DUPE) BORRO	на		10.21			C 6
12613	BP-1(DUPE) BORRO	H4		٠٠٠٤			D
		Avg	23	Max	c e	Min. D	
12514	BP-3 BORROW FIT	НА		1021			2.5
12514	BP-3 BORROW PIT	на		11.18			ε
		Avg	24	Max	2 8	Min D	
12615	HA-LCS	HA		-0.20			5.9
12615	HA-LCS	٦Å		11			ξ
		Avç	0.05	Max	D 1	Min D	
12622	LCS	HA.		102:			0.5
: <b>2</b> 522	LCS	АH		11/18			Ε
		Avg	0.05	Wax	5 1	Min. C	
12538	BP-2 BORROW P.7	4,4					£.
*2638	BP-2 BORROW P'T	-iA		1021			E \$
		Avg	0.5	Max	0 9	Mm: 0.1	
12639	F-1 DEAD CREEK-SE	HA		.021			٤٦
:2539	F-1 DEAD CREEK-SE	HA		11/18			٥
		Avg	C 35	Max	0.7	Min D	
12540	F-2 DEAD CREEK-SE	H4		102*			z ·
12640	F-2 DEAD CREEK-SE	HA		11/18			5 1

Sample Number	Client Sample Identifier	Species		Date	Ammonia Concentrati	on (mg/l)
		Avg:	0.1	Max: 0.1	Min: 0.1	
12641	F-3 DEAD CREEK-SE	НА		11/18		0.1
12641	F-3 DEAD CREEK-SE	HA		10/21		2.1
		Avg:	1.1	Max: 2.1	Min: 0.1	
12664	SEDIMENT; 2-1 GALL	IN		10/22		0
12664	SEDIMENT; 2-1 GALL	HA		11/19		0
		Avg:	0	Max: 0	Min: 0	
12665	SEDIMENT; 2-1 GALL	IN		10/22		2.1
12665	SEDIMENT; 2-1 GALL	НА		11/19		0.1
		Avg:	1.1	Max: 2.1	Min: 0.1	
12666	SEDIMENT; 2-1 GALL	НА		11/19		0.3
12666	SEDIMENT; 2-1 GALL	IN		10/22		1
		Avg:	0.65	Max: 1	Min: 0.3	
12668	LCS: 10/8/99 @ : (SE	IN		10/22		0.1
12668	LCS: 10/8/99 @ : (SE	НА		11/19		0
		Avg:	0.05	Max: 0.1	Min: 0	
12671	Ref2-2 Refference Bor	НА		11/19		0.1
12671	Ref2-2 Refference Bor	IN		10/22		0.5
		Avg:	0.3	Max: 0.5	Min: 0.1	

**AMMONIA ANALYSIS** 

Client: Muzie-Cura Ct. Chronic

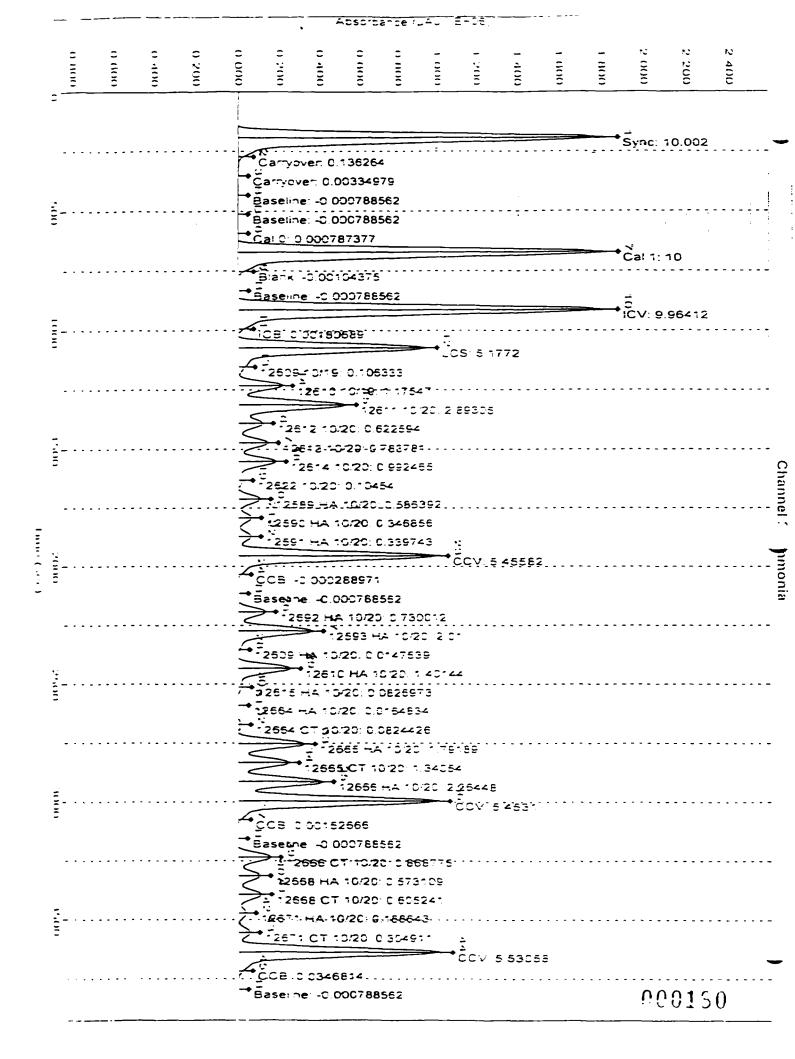
99033 BTR Number: <u>Screel</u>

Sample Date	Sample Description	10N NaOH (ml)	50 rul Sample (ml)	Meter Reading NH <sub>2</sub> -N (ppm)	
	Calibration:		<u> </u>		
	1 pom	/	/	1.55	,
	5 DUM	/		5.52	SLOPE = -58.4
	2 ppm EXT. STD.	<u> </u>	/_	1.92	
	O. Jupa				
	Black (DI)			L0.5	
11/29	12550   BTDX-D-2	<u> </u>		人0.5	
11/29	12551 [310x-D-3]			<0.5	
11/29	17612 BP-1Barow P.H	/		20.5	
11/29	12613 B213 MEDITORIA	E)\		<u> </u>	•
<u> </u>	105 STD. cineck (0,5)	1		0,491	•,
	JG	<del></del>			_
11/29	12668 [ABOC-US]			<u> 40.5</u>	
12/9	12548[BDX-C-3]	· /		<0.5	• }
12/13	12609 E-1 Dead Grux			<u> </u>	·
	0.5 STD. duck	_/_	<u> </u>	0.490	
	Blank (DI)			<u> </u>	•
					;; •
			<del></del>		•
			<del> </del>		•
			. <del>.</del>		

Analyst:	JG	Analysis Date:	12/23/99	
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ammonia.lwp

							Absort	pance	(µÀu) (	E+06)					· · · · · · · · · · · · · · · · · · ·		
-0.800	-0,600	-0.400	-0.200	0.000	0.200	0.400	0.600	0.800	1.000	1.200	1.400	1.600	1.800	2.000	2.200	2.400	
>											•						
			:											+ Sync:	10.004	s ·	
				·	N Carry	over, 0.	14776	1				· <del>-</del>	<b>-</b>	Sylic.	10.004	<u></u>	
:		· • :	1 1	1	arryo	ver: 0.0	002375	<b>1</b>	1		;						
ת 20 –		 			aselir	ne: -0.0	01355	63 ¦			· · ·	<del>.</del>	! 		· 		·
5  .	 		1 1	1 . [	. 11	ne: -D.0 <u>0.0013</u> :		63 ;	1 · · · · · · · · · · · · · · · · · · ·	:		1		+ +	1 1	1 : :	
			1 1		201.0.	0.0013	3320			===				◆	10	· .	' :
		<b>-</b> -			Blank:	-0.008	59676 T									1	
					Baselin	ne: -0.0	01355	63	·					 	10.104		
<u>}</u>					<u></u>	0.0078								ICV:	10.1:04:	3	
3					ICB: -	0.0078	8888		<del>-</del> → <sup>1</sup> N / 1 C	CS: 5.2	5047						
			1 1	5	+ω. 12 <del>0</del> 1	1 HA [	DAY10:	0.286	5144						:		
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			· · · · · ·	$\leq$		12 HA									•		
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					<u> </u>	1.2614	CT DA	Y10:-1	.06771			- <b></b> -					-,
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)				$\leq$	120	622 CT	DAY1	0: 0.7		ა 2 <u>CV: 5</u>	4664						
) ·					CCB: -	0.0068	 34711			J_Q_VQ	.=00=.	÷					
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					<b>→</b> "	2638 C 639 H				5					•		:
<u>)</u>			: 1	5	_υ.	9 CT E											
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					1264	OCRD	AY10:	0.301	318								
		<del>-</del>		<		926 326	41 HA	DAY1	0: 1.72 0: 1.69	2618			. <b></b>				
			. '		$ \ge $	- 4-	6 10/19			ω							
ა											547 10	0/19: 6.	21668	8			
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						0.0017		co ()									
				===	aseiin	e: -0.0	01355	w	2548 11	0/1 <del>/9</del> ∵-4	1291	1	<b>.</b>				
						→ <sup>0</sup>	₩9 10/										
s				_		<u>→</u>	12550	10/19:	2.188	57							
) 					ū		54-1-0/1		2039								
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>				4		0.0006	30303		, CC	V: 5.0	2637						
					Baselin	ie <del>: -0</del> :0	01355	<del>63</del>						f	<del>) () ()</del> ()	<del>7</del> 0	



Feak Table: ammonia

File name: F:\FLOW\_4\102799D.RST Date: October 28, 1999 Operator: LKS 27

		216					
ak	Cup	Name	Type Dil	Wt		Height	Calc. (mg/L)
ī	2	Sync	SYNC	1	1	1828142	10.004595
2	0	Carryover	CO	1	1	27244	0.147761
3	0	Carryover	CO	1	1	682	0.002375
В	0	Baseline	RВ	1	1	0	-0.001356
В	0	Baseline	RB	1	1	0	-0.001356
6	1	Cal 0	С	1	1	495	0.001355
7	2	Cal 1	С	1	1	1827302	10.000000
8	0	Blank	Ū	1	1	-843	-0.005968
В	0	Baseline	RB	1	1	0	-0.001356
10	2	ICV	U	l	l	1846458	10.104847
11	1	ICB	U	1	1	-1194	-0.007889
12	3	LCS	Ū	ī	1	959538	5.250472
13	31	12611 HA DAY10	Ü	<u>1</u>	1	52528	0.286144
14	32	12611 CT DAY10	Ū	1	1	139074	0.759838
15	33	12612 HA DAY10	Ü	1	1	104208	0.569004
16	34	12612 CT DAY10	Ū	1	1	82175	0.448412
17	35	12613 HA DAY10	Ū	1	1	76598	0.417885
18	36	12613 CT DAY10	Ū	1	1	136397	0.745184
19	37	12614 HA DAY10	Ū	1	1	78058	0.425879
20	38	12614 CT DAY10	U	1	<u> </u>	195324	1.067707
21	39	12622 HA DAY10	Ū ·	1	l	60178	0.328016
22	40	12622 CT DAY10	Ü	1	1	132205	0.722242
23	3	CCV	IJ ·	<u>1</u>	1	998992	5.466417
	l	CCB	Ū	1	1	-1003	-0.006847
	0	Baseline	RB	<u>1</u>	1	0	-0.001356
26	41	12638 HA DAY10	Ū	1	1	168841	0.922760
27	42	12638 CT DAY10	Ū	1	1	172681	0.943775
28	43	12639 HA DAY10	Ū	1	1	146820	0.802235
29	44	12639 CT DAY10	U	1	1	64895	0.353831
30	45	12640 HA DAY10	U	1	1	76847	0.419249
31	46	12640 CT DAY10	U	1	ī	55300	0.301318
32	47	12641 HA DAY10	U	<u> </u>	1	315631	1.726184
33	48	12641 CT DAY10	U	1	1	309039	1.690103
34	49	12546 10/19	U	1	1	256130	1.400515
35	50	12547 10/19	U	1	1	1136070	6.216682
36	3	CCV	U	1	1	982623	5.376822
37	1	CCB	U	1	1	-81	-0.001796
В.	0	Baseline	RB	1	1	0	-0.001356
39	51	12548 10/19	U	1	1 1	754658	4.129107
40	52	12549 10/19	U 	1	7	304925	1.667588
41	53	12550 10/19	Ŭ 	1	1	400111	2.188566
42	54	12551 10/19	บ 	1	1	278030	1.520385
43	55	12552 10/19	U	Ţ	1	35264	0.191653
44	56	12589 10/19	U	<u>.</u>	1	119406	0.652191
45	57 50	12590 10/19	U	7	1	152816	0.835053
46	58 50	12591 10/19	U	1 1 1 1 1 1 1 1 1	1	96616	0.527453
47	59	12592 10/19	U	<u> </u>	1	289912	1.585416
48	60	12593 10/19	U	<u> </u>	1	555099	
49	3	CCV	U	1	1	918593	5.026368
	1 0	CCB	U	1	1	133	
-s	U	Baseline	RB	1	1	0	-0.001356

Reak Table: ammonia

File name: E: FLOW\_4 102799E.RST Date: October 28, 1999 Operator: LKS

Reak	Cup	Name	Type Dil	W.t	;	ieight	Calc. (mg/L)
	2	Symp	SWC	-	•	1827617	10.001991
-	3	Carminar	22.	-		25041	0.136264
-	~	Carryover	CC CC R3	-	-	756	
<i>:</i>	-	Carryover		-	_	/35	0.003350
3	₽.	Baseline	23	_	1	5	-0.000789
3	٥	Baseline	æ	-	-	9	-0.000789
É	2000	Cal C	2	-	2	288	0.000787
-	2	Cal 1	2	<u>.</u>	1	1827253	10.000001
2	-	Blank	••	-	-	-47	-0.001044
2	-		22	-	-	• •	-0.000789
	_	Baseline 107 108 12809 10,19 12810 10/19 12811 10/20 12812 10/20 12813 10/20 12814 10/20		-	-		
	۷			-	<u>-</u>	1820698	9.964125
~ -	3	ICB		-	=	474	0.001807
	3	LCS		-	2	946075	5.177200
1.3	£l	12609 10,19		-	-	19572	0.106333
<u>: :</u>	62	12610 10/19	••	-	-	214916	1.175473
	£3	- 26	·.	-	-	528736	2.893049
	64			-	-	113899	2.622594
~ :	5 =	_25_2 4-	•	-	_		0.022094
-	€ 5	12513 11/45	~	_	_	143349	0.783781
: <b>:</b>	€ €	12614 10.20	Ü	=	=	181478	0.992465
. ;	€ -	12622 10 20		-	-	19245	0.104540
	€ €	12589 HA 10/20			_	107284	0.586392
	£ 9	12622 10/20 12689 HA 10/20 12680 HA 10/20 12691 HA 10/20	••	-	-	19245 107254 63518 62219	0.346856
		10201 22 10 01		-	=	20000	0.339743
	-			-	-	996983	
4 J	3	CC3 CC1	-	-	-		5.455823
÷ =	-	eus .	<u> </u>	-	_	91	-0.000289
Ξ	2	水型552 HB 10/20	RB 10 10 10 10 10 10 10 10 10 10 10 10 10	-	-	<b>2</b>	-0.000789
3.6		22 22 22		<u>-</u>	<u>-</u>	133525	0.730012
<u> </u>	9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12593 HA 10/20 12593 HA 10/20 12610 HA 10/20 12615 HA 10/20	-	-	<u>-</u>	367392	2.009997
2 €	- 3	12609 HA 10, 20	· •	-	•	2840	0.014754
7.2	- <u>·</u>	12613 HA 10/20	••	-	-	256213	1,401440
	-=	12615 HA 10/20		-	-	15254	0.082697
		12513 FF 10, 20	-	-	<del>-</del>	-3234	
<i>:</i> -			-	_	-	3156 1520	0.016483
<i>:</i> ∠			-	_	_	_525	0.082443
::	T ê	12665 HA 10/20 12665 CT 10/20	Ü	-	_	327542	1.791890
34	7,9	12665 CT 10/20	÷	<u>-</u>	<u>-</u>	245075	1.340539
3.5	£ 0		-	-	<u>-</u>	413889	2.264477
3 <b>5</b> 3 <b>6</b>	•	CCT CCB Baseline	• •	- - -	-	996484	5.453096
	-	202		-	-	423	0.001527
_	-		-	-	-	=23	
= _	-	saseline	RB	_	-		-0.000789
5 E 5 C C C C C C C C C C C C C C C C C	3.	12666 OT 10/20 12668 HA 10/20 12668 OT 10/20 12671 HA 11/20	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5			158879	0.868775
<i>÷</i> :	8.2	12668 HA 10/20 12668 CT 10/20 12671 HA 11 20		-	-	204837 204837 210728 24622 25832 20042	0.573209
<u> </u>	93	12868 OT 10/20	·-	-	-	110728	0.605241
42	Ξ÷	12671 #3 11 21	<u>:</u>	-		34617	0.198643
43	8.5	12671 CT 10 20		-		=====	0.304911
 	3	CC:	÷	-	-		5.530580
	<i>:</i>		-	-	-		3.330380
÷ 5	-	003		-	_	5461	0.034681
3	;	Baseline	23	-	2	3	-0.000789

Pesk	C-5	Flags
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2	•	
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Beak Table: ammonia

Pesk	Cup	Name	Type Dil	Wit	Height	Calc. (mg/L)
•	<del>;</del>	Symo	SYNC 1		1683774	9.302330
-	Q 0 0	Carryover	21.,0	-	26092	0.142000
-	-	Carryover	00 i 00 i	-	362	-0.000183
<i>:</i>	-	- Carryover - Baseline	RB 1	<del>-</del>		
=	-			-	0 0	-0.002186
3	2	Baseline	<b>73</b> 1			-0.002186
É	1	Cal 0	- C	-	792	0.002186
-	2	Cal 1	2 1	1	1810026	
3	0.7100000000000000000000000000000000000	Blank	0 1 0 2 7 1 RB 1	•	-2916	-0.01 <b>8</b> 301
3	=	Baseline		-	٤	-0.002186
	2		: :	•	1814510	10.024775
- :	-	- 0=		-	-1504	-0.010496
	-	- 05		-	975757	5.389835
- <del>-</del>	ε.	103 103 105 12611 MA 10,21 12612 MA 10,21	· ·	-	32133	2.159720
	92			-	391235 111162 111998 131312	0.550753
- <del>-</del>	<i>52</i>	_45_4	-	-		
- =	93	12613 FA 10-21	<del>-</del>	-	1. 333	0.594612
<u> </u>	9 ÷	12614 HA 11-21	T 1	-	151312	0.833909
	95	12622 HA 10,21 12638 HA 10,21 12638 HA 10,21 12639 HA 10,21 12640 HA 10,21 12641 HA 10,21	: :	<u>-</u>	16694	0.090064
<u>:                                    </u>	5 €	12638 HA 10,21	<u>:</u> <u>:</u>	2	166854	0.919846
13	9 -	12639 HA 10/21	: :	-	135945	0.749046
3.1	9.8	12640 HA 10/21	:	-	25243	0.137308
	9.9	12641 HA 11 21	·· ·	•	387277	2.137903
; <del>;</del>		19445 07 11 91		-	387277 10124	2.0537€0
23	- :	cc:	<del>-</del> :		896232	4.950380
	-	002	: :	-	-2020	-0.007825
<u> </u>	-	Baseline	:	-		
= ,	99	aaseline		-		-0.002186
2 €		12668 13/21 12664 13/22	-	-	11937	0.063780
2 =	112	12664 10.22	1	-	2525	0.011774
2 🗄	103	12665 10/22	<u>-</u>	-	377090	2.081606
2.3	102	12665 10/22 12666 10/22		-	2526 377390 189860	1.846979
3:	115	12668 10/22	: :	<u>-</u>	11183	0.054083
3:	106	12668 13/22 12671 13/22 CC7	: :	-	96333	0.530148
3.2	3	cc:	· ·	•	898288	4.961744
33	3 .	CCB	·	:	-1026	-0.007857
=	-	Baseline	Ra :		~ ~ ~	~0.002186
-	-	-6-5-1.5	-	-	-	70.002.00

Peak	Crb	Flags
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					•	Blank	c: 0.0	07614	466												
						Base	line: (	2.000	2994	46		<u>-</u>					→ <u>.</u> 6.		.3106		
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Peach ,able: ammonia

File name: F: FLOW\_4 1123990.RST Date: November 237 1999

Operator: nww

Peak	~	Name	Type Dil	Wt		Height	Calc. (mg/L)
•	2 .	Symo	SYNC	-	-	1139012	13.201578
5	<u>-</u>	Carryover	CC	-	-	4260	0.038450
2	000000	Carryover	C3	•	-	228	0.002345
0 (II (II) (C)	-	Baseline	RB	-	-	220	0.000299
5	-	Baseline	RB RB	-	-	-	0.000299
	-	Cal 0	KS ^	-	-	c =	-0.000299
5	-		-	-	-	-67	
,	۷ .	Cal i		-	-	1116505	10.000001
5	302	Cal 1 Blank Baseline 107 108 108 12639 HA 11/10 12640 HA 11/10 12640 HA 11/10 12668 CT 11/10 12664 HA 11/11 12666 HA 11/11 12666 HA 11/11		-	-	817	0.007615
Ξ	Ü	Baseline	R.3	-	_	Ú	0.000299
	2	10:	Ü	-	-	1151190	10.310653
	-	103	ü	_	-	-777	-3.006659
12	3	LCS	··	-	_	601625	5.388603
<u>:</u>	3 _	12639 HA 11.10	-	-	-	4085	0.036883
<u>:                                    </u>	32	12640 HA 11/10	-	<u>.</u>	-	2793	0.025316
1.5	33	12641 HA 11 10		<u>-</u>	-	6435	0.057931
: <del>(</del>	3 4	12665 CT 11,11		-	-	23411	0.209970
· -	3.5	12668 CT 11/10		_	-	31353	3.281107
- E a	3.6	12664 HA 11 11	- <del>-</del> -	-	-	4426	0.039939
- :	; -	19885 22 11 11		-	-	17084	0.153305
Ž:	- = =	- 7244 - 1 - 1 - 1	••	-	-	152272	1.364084
	9 9 9 9	12668 CT 11/10 12664 HA 11 11 12665 HA 11/11 12666 HA 11/11 12671 HA 11/11		-	-	2598	0.023567
22	40	12671 HA 11/11	•	-	-	3573	0.032304
23	7.		-	-	-	598809	5.363383
2: 2:4		CC3	•	<del>-</del>	-	534	0.005082
	-	7.2.2.2.6.2.6		-	-	235	
3		Baseline	7. <b>.</b>	-	-		3.000299
26	<u> </u>	12546 HA 11 16	-	_	_	23604	0.211699
2-	÷2	12547 HA 11, 16		<u>-</u>	-	74150	0.664405
28	43	12548 HA 11/16	-	-	_	89489	0.621947
2 5	44	12549 HA 11,16	-	<u>-</u>	-	3920	0.035405
3:	4.5	12550 HA 11 16	·· •	<u>-</u>	_	4098	0.036999
31	46	12551 HA 11/16		<u>-</u>	-	3219	0.029130
3.2	<u> </u>	12552 HA 11 16	·- •	<u>-</u>	_	2085	0.018975
3 3	48	12548 CT 11 16	-	-	-	65738	0.589065
34	49	12550 CT 11/16	÷	<u>-</u>	-	43418	0.389165
3 5	50	12551 CT 11.16		-	-	15786	0.141687
3 €	3	27			-	597690	5 353364
3 -	:	003 003	···	_	-	417	0.004030
3	2	Baseline	23	-	-	2	0.000299
	= -		••	-	-	-222	0.004030 0.000299 0.064981
<u>.</u> -	= 7	12592 CT 11/16		-	-	2020	0.044782
<u>.</u> :	= =	12593 CT 11/16		-	-	300	0.101526
÷ 2	= 4	12593 CT 11/16 12609 CT 11 16		-	-	- 2- 070	1.622023 0.086932 0.027356 0.013232
43	==	10500 23 11 17		•	-	2572	0.094633
	= = =		- 	-	-	30:0	0.000332
4 5	= -	10260 20 11 1	•	-	-		0.027356
7.5	= = =	12332 AA 11,1	-	-	-	-77-	3.913232
48		12592 CT 11/16 12593 CT 11/16 12593 CT 11/16 12609 CT 11 16 12589 HA 11 17 12593 HA 11/17 12593 HA 11/17 12609 HA 11/17	RB (0.00 to 10.10 to			227 4962 11302 191072 9673 1444 122963 42963 42964 597042	0.110375
	2.7	12005 Mm 11/1	-	-	-	::55:	0.358222
÷ 5	= -	12010 mA 11/17	-	-	-	4254	0.038762
4.5	٤	CC/,	- <del>-</del>	_	-	597042	5.347564
5:	-	113	-	-	_	-232	-0.001774
3 52	<b>:</b>	Tacalina	RB	-	-	÷.	0.000299
5.2	£ 1	12615 HA 11:17		-	-	3020	0.027343
53	62	12511 CT 11/17	RB U	<u>-</u>	-	12580	0.112970
54	63	12618 HA 11/17 12611 CT 11/17 12612 CT 11/17		-	_	12580 12456	0.111854

Peak	Cup	Name	Type Dil	Wt	Н	eight -	Calc.	(mg/L)
55	64	12613 CT 11/17	U	1	1	7343		0.066061
56	65	12614 CT 11/17	IJ	1	1	3986		0.035998
57	66	12622 CT 11/17	Ū	1	1	2217		0.020156
?	3	CCV	Ū	1	1	592836		5.309892
	ī	CCB	Ū	1	1	111		0.001298
В	0	Baseline	RB	1	1	. 0	-	0.000299

Peak	Cup	Flags
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20 21 22 24 26 27 28 29 31 32 33 34	\$ 0, 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	BL
27 28 29 30 31 32	42 43 44 45 46 47	
33 34 35 36 37 8	49	BL
33333444345678	5 3 1 0 1 2 3 4 5 6 7 8 9 0 5 5 5 5 5 6 6	
46 47 48	57 58 59 60	

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					$\rightarrow$	1309	200	1 1122	2 - 2	52084 53275	•										
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Peak Table: ammonia

File name: F:\FLOW\_4\112399E.RST Date: November 23, 1999

Operator: nvw

k.	Cup	Name	Type Dil	Wt		Height	Calc. (mg/L)
7	2	Sync	SYNC	 ¬		1143680	10.089201
2	0	Carryover	CO	1 1	1	3966	0.035824
3	0	Carryover	CO	1	i	291	0.003401
B	0	Baseline	RB	1	1	0	0.003401
В	0	Baseline	RB	1	i	0	0.000836
6	i	Cal 0	C	1	1	-190	-0.000836
7	2	Cal 1	C	ī	ī	1133567	10.000000
8	ō	Blank	Ū	1	1	-309	-0.001893
В	Ö	Baseline	RB	ī	1	0	0.000836
10	2	ICV	U	1	1	1132700	9.992354
11	1	ICB	U	1	1	340	0.003831
12	3	LCS	U	1	1	599722	5.290965
13	91	12611 HA 11/18	Ū	<u>1</u>	<u> </u>	5174	0.055296
14	92	12612 HA 11/18	U	1	1	7674	0.068530
15	93	12613 HA 11/18	U	1	1	3491	0.031631
16	94	12614 HA 11/18	Ū	1	1	796	0.007859
17	95	12622 HA 11/18	Ū	1	<u>1</u>	358	0.003997
18	96	12638 HA 11/18	U	1	l	5866	0.052576
19	97	12639 HA 11/18	Ū	1	1	3034	0.027599
20	98	12640 HA 11/18	U	1	<u> 1</u>	6348	0.056835
21	99	12641 HA 11/18	U		1	9369	0.083483
22	100	12665 CT 11/18	U	1	1	24463	0.216626
23	3	CCV	Ŭ	1	3	587626	5.184266
-	1	CCB	U	l	1	822	0.008084
	0	Baseline	RB	1	1	G	0.000836
26	101	12668 CT 11/18	Ŭ	1	1	2520	0.023062
27	102	12664 HA 11/19	U	1	1	2177	0.020041
28	103	12665 HA 11/19	U	1	7	8852	0.078920
29	104	12666 HA 11/19	U	1	1	29219	0.258574
30 31	105	12668 HA 11/19 12671 HA 11/19	U	1	1	2620	0.023945
3 ± 3 2	106 107	12671 HA 11/19 10220 CT 7/22	U U	1	<u> </u>	7275 28483	0.065011 0.252084
33	108	13097 EFF 11/3	บ	<u>1</u> 1	1	5945	0.053275
34	109	13098 REC 11/3	บ	<u>.</u>	÷ ;	18960	0.168085
35	110	13204 EFF 11/5	Ŭ	ī	1	9172	0.081741
36	3	CCV	Ŭ	7	ì	582533	5.139346
37	<u> </u>	CCB	Ū	- 1		313	0.003600
B	ō	Baseline	RB	ì	1	0	0.000836
39	111	13222 EFF 11/8	Ū	1 1 1 1 1 1 1 1	1 2 1	6245	0.055922
40	112	13300 HT 11/13	U	1		18628	0.165149
41	113	13301 HT 11/13	U	1	1 1	11709	0.104120
42	114	13302 HT 11/13	U	<u>1</u>	<u>1</u>	93324	0.824047
43	115	13303 HT 11/13	U	1	1	12261	0.108987
44	116	13304 HT 11/13	U	1	1 1 1 1 1	9679	0.086214
45	117	13104 HA 11/19	U	l	<u>1</u>	30191	0.267151
46	118	13105 HA 11/19	U	l	<u>1</u>	27177	0.240561
47	119	13106 HA 11/19	U	1	1	21078	0.186761
48	120	13107 HA 11/19	U	l		5684	0.077439
49	3	CCV	U	1 1 1 1	1	581603	5.131139
	1	CCB	U	1	1	710	0.007103
	0	Baseline	RB		1	0	0.000836
52	0.8	13108 HA 11/19	U	1	1	22213	0.196776
53	81	13110 HA 11/19	U	1	1	38856	0.343588
54	82	13104 HA 11/9	ט	1	1	241	0.002960

Peak	Cup	Name	Type Dil	Wt	Height	Calc. (mg·l)
3 5	83	13105 HA 11 9	••	:	-25	0.000618
5 <b>f</b>	£ <b>4</b>	13106 HA 11/9		:	5045	0.045339
5 -	£5	13107 HA 11,9		-	1 9808	0.087329
5 5	€ €	13108 HA 11/8		-	1 19958	0.176881
5 5	57	13110 HA 11/9	::	<u>.</u>	1 17064	0.151353
£ :	- 3	CCV		-	1 584812	5.159447
έ÷	1	CCB	:-	-	1 652	0.006590
3	0	Baseline	23	-	1 0	0.000836

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		onia Analyses (Total, mo Dead Creek / Project 99	
Sample	Porewater	Day 0 Overlying	Day 10 Overlying
ID		Water	Water (
12546	6.3	1.4	<0.5/
12547	23.1	6.2	2.5
12548	17.3	4.1	0/5
12549	7.4	1.7	0.6
12550	9.3	2.2	/0.9
12551	5.9	1.5	0.9
12552	-	<0.5	<0.5
12589	2.9	0.7	0.7
12590	4.4	0.8	<0.5
12591	2.1	0.5	<0.5
12592	5.7	1.6	0.7
12593	13.3	3.0	0.5
12609	. 2.2	<0.5	<0.5
12610	7.1	1.2	<0.5
12611	12.9	2.2	< 0.5
12612	2.4	0.6	<0.5
12613	2.7	0.6	0.7
12614	3.5	0.8	<0.5
12622	-	<0.5	<0.5
12638	4.0	0.\$	0.5
12639	1.6	9.7	0.8
12640	0.6	<b>₹</b> 0.5	<0.5
12641	6.4	2.1	1.1
12664	<0.5	<0.5	<0.5
12665	10.3	3.4	1.8
12666	6.7	2.2	2.3
12668	-	<0.5	0.6
12671	2.4	0.7	<0.5

1) Data partain to acute toxicity rests only 8,218/99

	K 2 /		NVW	JWI	V
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	ABS	NVW	JWW	
#	Sample ID	40-5 ppm	20-5	·····
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3	12671 PW			
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15	668 0			
()	671 Y	<u> </u>		
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15, 1263 <u>6</u> 2:	
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7. 17666 N. N	· · · · · · · · · · · · · · · · · · ·
721 17666 N. N.	
	3/2/29
5.0 11.12 MS	<u></u>
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### **Sediment Characterization**

Client: Menzie-Cura & Assoc. Project: 9903	3 BTR: 3615
Date sediments distributed to test chambers (  H. azteca acute test: 10/6/99 10/18/99:	100 mL homogenized sediment):
• C. tentans acute test: 10/6/99	•
<ul> <li>H. azteca chronic test: 10/18/49; ALL SAM</li> <li>C. tentans chronic test: 10548, 12550, 12</li> </ul>	PLES JG for LS
• C. tentans chronic test: 18548, 12550, 12	551; 10/18/99 JGG LS

10/28/99 - Lozded sodinents for examples (12548, 12550, 12551, 12552,

Sample	porew	porew	porew	12542, 12593, 12609)
Number	рН	H2S	Amm	Sediment Visual Characterization
12546	6.9	······································		Viscous mud, NO Overlying water
12547	7.0			Liquid fine much many freshwater
	7.0			Liquid, fine mud many freshwater  gastropoids  removed visible gastropoids is
12548	7-0			Liquid mud, gastropads present, removed
12549	7.0			Soft mud. pine needles, some overlying water
12550	7.0			Soft mud with overlying water pine need les
12551	7.0			Soft mud with overlying water
12552	\ \( \cdot \)			EPA artificial control sediment (77% med. and fine sand;
LCS	mic16199			17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples. Date: 10699

Reviewer: Date:/1/0/99
Laboratory: Aquatec Biological/Sciences, South Burlington, Vermont

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### **Sediment Characterization**

		C	- D	2   DTD: 20	22 / 2000
			Project: 9903		22 / 3629
U				100 mL homogenized sedin	nent):
•			, .	TM (Hydells rejest)	
•		cute test: 10/7	/99		
•	H. azteca ch	ronic test:	/- / . 0-		*Sample 12592
•	C. tentans c	hronic test: 10	1/18/99 : 105	92,12593,12609 TM	Sieved to reprove
					indigenous charain
-	0			<del>,</del>	(151 C.C. 5.0
- 1	Sample		orew porew H2S Amm	Sadiment Visual Ch	orootovinstie –
-	Number	<del> </del>	<del></del>	Sediment Visual Ch	<del></del>
	12589	7.1		khrown muddy selling	nt with sticks a
_	12590	6,9		hans discour	VELST IVEN
-	12591		<i>d</i>		U .
	12551	69		bear mud with in	a material
	× 12592	7.1		ak busin mud wit	$\cup$
-	12593		<del></del>		
_		+10		black watery mus w,	petrolun-like ode
	12609	7.1			sive musi with
-	12610	17	<del></del>	<del>-</del>	
-		9.		at brown very Thick	Colising mid
					'
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		· ·			
_	12615			EPA antificial control sediment (	•
	LCS			17% kaolinite clay, 5% 0.5 mm-s Stored dry, then hydrated prior to	· · · · · · · · · · · · · · · · · · ·
-				d pH, decant and preserve su	ulfide and ammonia
	Enter	ed by:	Date Ic 7 49	- -	000135_
9e.	prever Di	te 12/10/99	urlangton Vermont		hasurvet.
		g	· · · ·		

### Sediment Characterization

Client: Menzie-Cura & Assoc. Project: 99033 BTR: 3629 / 3633

Date sediments distributed to test chambers (100 mL homogenized sediment):

H. azteca acute test: 10/8/99C. tentans acute test: 10/8/99

H. azteca chronic test:C. tentans chronic test:

Cample	7 2224	207011	7.0.70	<del></del>
Sample	porew pH	porew H2S	porew Amm	Cadimant Views) Characterization
Number	Pit	1123	Anna	Sediment Visual Characterization
12611	6.8			black mud w/leaf litter
12612		<del> </del> -		Fine Brown Mud
	7.7			Fine dicarring
12613	77			Soft Brawn mud
	7.7			SUTT DIGUIT TO ST
12614	7.5			Soft Brown mud
12638	-7 /		<del></del>	Soft Brown mud
 	7.6			· ·
12639	7.3			sticks + leaves on top + through out conesive mud, daik
	710		· · · · · · · · · · · · · · · · · · ·	conesivemua, doik
12640	7.2			Sticks + leaf litter
	!			Dark thick mud
12641	72	ļ		SOFT Brown mud
		_		
12622				EPA artificial control sediment (77% med, and fine sand;
LCS				17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia

intered by: JJG Date: 10/8/99

200136

Reviewer: Date: 12/10/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Number	porew pH	porew porew H2S Amm	Sediment Visual Characterization
12664	7.8		first cohesive made
	! 		
12665	7.3		the soft mud
12666	·		E . South Makes a mid
	7,5		tirs. Sticky / (chesive mud
12667-JG	<u> </u>		
2671	7.4		fine, brown mud - chimonides

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples

Entered by: 10/4/49

000107

EPA artificial control sediment (77% med. and fine sand: 17% kaplinite day: 5% 0.5 mm-sieved peat; 1% CaCO3).

Stored dry, then hydrated prior to addition to test chambers.

12668

LCS

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## Preparation of Formulated Control Sediment for Freshwater Sediment Toxicity Tests

Procedure based on EPA/600/R-94/024

Batch No. ic/4 Preparation Date: 14/99 Prepared by: 176.

Ingredient	Amount (g)	Percent composition
Fine sand Medium sand	1848 924	77
Kaolinite clay	612	17
Blended and 0.2 mm sieved Canadian sphagnum peat	180	5
CaCO3	36	1
Total	3600	100

Store well-mixed and dry in a sealed Rubbermaid box. Label by batch number. Store copy of this documentation in project file. Store original in Sed/Water preparation notebook.

Hydrate to a cohesive sediment consistency before use.

### Week of October 17, 1999

ACTIVITY / DAY	Sun.	. Mอก.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	V	<u> </u>			V		/
Noon delivery cycle				1			
• soliter baxes filling?		:/		W.			
• synnges filling?	-/		V.				
• needles flowing?				V	./	;	V
• peaker screens clear, flowing?					V		1/
• pramage to weste ou?		_//	V	///	/		
· error, waste duckers FINICE					10	VV	1/
Test monitoring PAIL!		<del></del>				<del></del>	
test temperature ox?     D C ox?						<del></del>	<u> </u>
check for floating organisms	<del></del>	<u> </u>					+
feeding completed?	<u> </u>	$\sqrt{a}$	$\overrightarrow{}$	1/	<del>-</del>	<del>-                                    </del>	
Additional activities Prorse medight fill reservors (*					V.		
Check sediment water supply			/			V	1
Corrective Action / Comments	, C	× 11-		<u> </u>		; ; ; ;	
					<del></del>		

Procedure: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data backage.

Comments	(.417-5	1000	185 G	1.50	40	co Per-1	(des
		227-256				<del></del>	
-			<del></del>				

Expert wire for Harding

= Leve / Recov Mix

= Recen Water

seddeling doc 10/2/4

Reviewer Date 17/9/99
Laboratory Aquated Biological Sciences South Burlington Vermont

### Week of October 31, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.			
Prior to noon fill reservoirs (1L)	V			$\checkmark$	V	V .				
Noon delivery cycle										
• splitter boxes filling?	<b>/</b>	~	V.	V	V		/			
• syringes filling?		/	V	<b>V</b>						
• needles flowing?	V		./	1	/					
<ul> <li>beaker screens clear, flowing?</li> </ul>	V	V	V,	V	<b>V</b>	V.				
drainage to waste ok?	l id	11	y y	7	1	Y	4			
empty waste buckets?	VV	VV		VV	VV	1	VV			
Test monitoring							· · · · · · · · · · · · · · · · · · ·			
• test temperature ok?	V	V	V	V		1	1			
• D.O. ok?		, V,	·		-					
check for floating organisms		7			V		1			
• feeding completed?		V	1	V			V			
Additional activities										
Prior to midnight fill reservoirs (1L)		V		V,	1,	V/				
Check sediment water supply		<b>V</b>				V				
			***	·	<del></del>	<del></del>				
Corrective Action / Comments										
Initials/Date	16/31	11/1=	1/2/16	113	77	11/5	11/6			
Procedure: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.										
Comments: 11/5/99 (midnig					indiat 10		09:30 /99 JJG			
"Nook" renewal conducted at 14:00 11/6 JG 11/6/99 JJG										

 $\sigma \circ \sigma \circ \circ \circ 0$ 

### Week of November 7, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fn.	Sat.
Prior to noon fill reservoirs (1L)			V	$\checkmark$		<b>/</b>	
Noon delivery cycle		<u></u>					
• spitter boxes filling?			W.				V
• synnges filling?							<b>V</b>
• needies flowing?				<b>√</b>			
• peaker screens clear, flowing?		-/	· V		/	! //	
oramage to waste ok?					V/		1
• emaily waste buckets?	VV	VIV	VV	VV	IVIV	V/	VV
Test monitoring		<del></del>	<del></del>			· · · ·	<del></del>
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• 30 ok?					<u> </u>	LV,	
check for floating organisms			<u> </u>	V		1/	1
• feeding completed?	<del></del>			V	<u> </u>	1/	
Additional activities		<del>. ,</del>					<del></del>
Phor to midmight fill reservoirs (*L			1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	/		× /
Check secument water supply			· 1/			<u> </u>	
Corrective Action / Comments	برز	<u> </u>	:				
initials Date	m - join	1/8 M	m is	عرالي <sup>ا</sup> /اد	in De	1412	11/13
Procedure All operating system tests are in progress. Corrective on this form, lift project-specific a Documentation form) and include Comments:	e action mu socumenta	iust be take ation is requ	en wheneve uired, write	er appropn	nate Docu	iment corre	

<u>000291</u>

### Week of November 14, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
[ B :	1			· · · · · · · · · · · · · · · · · · ·			
Prior to noon fill reservoirs (1L)							
	<u>'</u>		<u> </u>				<u> </u>
Noon delivery cycle	·						
• splitter boxes filling?	V	V		<b>V</b>	√,		
syringes filling?	V.		V	V	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
• needles flowing?	/				$\checkmark$		
<ul> <li>beaker screens clear, flowing?</li> </ul>					- /		
drainage to waste ok?	1	Y	A	4	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	4	4
empty waste buckets?	VV	VV		77		V \	VV
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Test monitoring			<del> </del>			······································	
• test temperature ok?	V	<u> </u>	V	$\sqrt{}$	✓	$\sqrt{}$	<b>✓</b>
• D.O. ok?			1/			V	
<ul> <li>check for floating organisms</li> </ul>		·//	//		·/	V/	V
• feeding completed?		V			i/	V	
Additional activities					,	/	,
Prior to midnight fill reservoirs (1L)	1/	./	1	1/	I V.	V	
Check sediment water supply	./				V	\ <u>\</u>	./
	<u> </u>						
Corrective Action /							
Comments							
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Initials/Date	Mili	1910/99	1111	1711	1:110	11119	11/20
December All approxima system	s listed ob			d on a daile	, bosis who		t taviaitu
<u>Procedure</u> : All operating system tests are in progress. Corrective							
on this form. If project-specific d							
Documentation form) and include					· ,	<u> </u>	
Comments:							
						<del></del>	

Reviewer \_\_\_\_\_ Date \_\_\_\_ / 2/97
seddelfw.doc \_\_\_\_\_ Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

### Week of November 21, 1999

ACTIVITY / DAY	Sun.	Mon	Tues.	Wed.	Thurs.	Fn.	Sat
Prior to noon fill reservoirs (1L)					/	V	/
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Reviewer Date 12999 Seddethwood Laboratory Aquated Biological Sciences South Burungton Vermont

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Reviewer \_\_\_\_\_ Date 12/9/99 seddeffw.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Reviewer Date 11/21/99
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Laboratory: Aquated Biological Sciences: South Bunington, Vermont

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

### SEDIMENT TEST MANUAL RENEWAL

DAILY SCHEDULE: MORNING (0700 - 0800) AND EVENING (1800-1900)

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### SEDIMENT TEST MANUAL RENEWAL

### DAILY SCHEDULE: MORNING (0700 - 0800) AND EVENING (1800-1900)

November, 1999

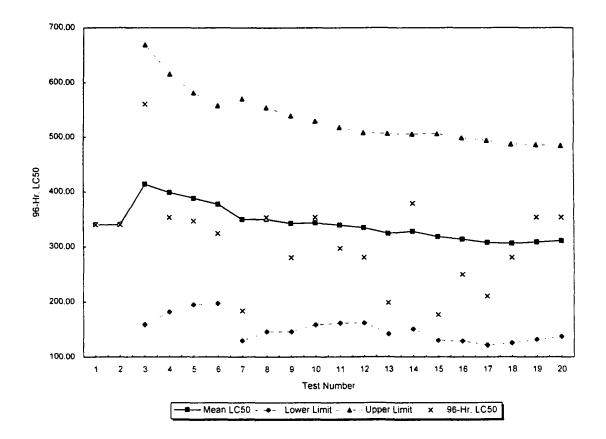
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## Reference Toxicant Control Chart Hyalella azteca in Potassium chloride (mg/L)

		Organism					
Test Number	Test Date	Age (Days)	96-Hr. LC50	Mean LC50	Lower Limit	Upper Limit	Organism Source
1	04/15/98	8	340.198	340.20			Env. Consult & Testing
2	04/17/98	10	340.198	340.20	340.20	340.20	Env. Consult & Testing
3	08/04/98	14	561.231	413.88	158.65	669.10	Env. Consult & Testing
4	08/22/98	10	353.553	398.80	181.85	615.74	Env. Consult & Testing
5	09/13/98	11	347.163	388.47	194.99	581.94	Env. Consult & Testing
6	10/26/98	12	324.210	377.76	196.93	558.59	Env. Consult & Testing
7	11/13/98	10	183.717	350.04	129.21	570.87	Env. Consult & Testing
8	02/19/99	9	353.553	350.48	146.02	554.94	Env. Consult & Testing
9	05/13/99	8	280.616	342.72	145.87	539.56	Env. Consult & Testing
10	06/21/99	12	353.553	343.80	158.09	529.51	Env. Consult & Testing
11	06/25/99	14	297.302	339.57	161.17	517.97	Env. Consult & Testing
12	06/26/99	10	280.616	334.66	161.19	508.13	Env. Consult & Testing
13	07/02/99	7	198.425	324.18	141.71	506.65	Env. Consult & Testing
14	07/07/99	8	378.929	328.09	150.35	505.83	Env. Consult & Testing
15	07/07/99	7	176.777	318.00	129.75	506.26	Aquatic Research Organism
16	09/13/99	11	250.000	313.75	128.73	498.77	Aquatic Research Organism
17	10/08/99	9	210.224	307.66	121.61	493.71	Aquatic Research Organism
18	10/23/99	13	280.616	306.16	125.21	487.11	Aquatic Research Organism
19	10/23/99	9	353.553	308.65	131.47	485.84	Aquatic Research Organism
20	11/09/99	12	353.553	310.90	137.27	484.53	Aquatic Research Organism



### Summary of Sauget 1999 Hyalella azteca statistical analysis 3/21-23/01

Additional statistical analyses were performed. When a sample mean response value was equal to or greater than the corresponding reference site value, the result was assumed to be not significant, without statistical analysis. \* Indicates a statistically significant reduction was detected (P<0.05).

1. The data for reference sites Prairie Dupont (Sample 12664, PD) and Prairie Dupont 2 (Sample 12665, PD2) were compared against each other:

### Results of Reference Site Comparisons

Day 28 survival: Not significant

Day 28 growth: \* Reference 12664 (PD) < Reference 12665 (PD2)

Day 35 survival: Not significant Day 42 survival: Not significant

Day 42 reproduction: \* Reference 12664 (PD) < Reference 12665 (PD2)

Day 42 growth: \* Reference 12664 (PD) < Reference 12665 (PD2)

2. The data for reference sites Prairie Dupont (Sample 12664, PD) and Prairie Dupont 2 (Sample 12665, PD2) were combined and then the sample data for samples 12612 (BP1); 12613 (BP1FD); 12614 (BP3); and 12368 (BP2) were compared to the combined reference site data:

### Results of Multiple Sample Comparisons vs. Combined Reference Sites

Day 28 survival:

Day 28 growth:

Day 35 survival:

Day 42 survival:

Day 42 reproduction:

Day 42 growth:

Not significant for all samples

Not significant for all samples

Not significant for all samples

Not significant for all samples

Not significant for all samples

Not significant for all samples

3. The data for individual reference sites Prairie Dupont (Sample 12664, PD) and Prairie Dupont 2 (Sample 12665, PD2) were compared directly with the sample data for each individual sample for samples 12612 (BP1); 12613 (BP1FD); 12614 (BP3); and 12638 (BP2). The results of the statistical analysis were:

### Results of Single Sample Comparisons vs. Individual Reference Sites:

Day 28 survival:

12638 (BP2) vs. 12664 (PD): Not significant 12638 (BP2) vs. 12665 (PD2): Not significant

Day 28 growth:

12612 (BP1) vs. 12665 (PD2):
12613 (BP1FD) vs. 12665 (PD2):
12614 (BP3) vs. 12665 (PD2):
12638 (BP2) vs. 12665 (PD2):

Not significant \* (BP3 < PD2)
Not significant

```
Day 35 survival:
                                             Not significant
      12613 (BP1FD) vs. 12664 (PD):
                                             Not significant
      12613 (BP1FD) vs. 12665 (PD2):
                                             Not significant
      12638 (BP2) vs. 12664 (PD):
                                             Not significant
      12638 (BP2) vs. 12665 (PD2):
Day 42 survival:
      12613 (BP1FD) vs. 12664 (PD):
                                             Not significant
      12613 (BP1FD) vs. 12665 (PD2):
                                             Not significant
      12638 (BP2) vs. 12664 (PD):
                                             Not significant
      12638 (BP2) vs. 12665 (PD2):
                                             Not significant
Day 42 growth:
      12612 (BP1) vs. 12665 (PD2):
                                             * BP1 < PD2
      12613 (BP1FD) vs. 12665 (PD2):
                                             Not significant
      12614 (BP3) vs. 12664 (PD):
                                             Not significant
                                             * BP3 < PD2
      12614 (BP3) vs. 12665 (PD2):
      12638 (BP2) vs. 12665 (PD2):
                                             Not significant
Day 42 reproduction:
                                             * BP1 < PD2
      12612 (BP1) vs. 12665 (PD2):
       12613 (BP1FD) vs. 12665 (PD2):
                                             Not significant
       12614 (BP3) vs. 12665 (PD2):
                                             Not significant
       12638 (BP2) vs. 12665 (PD2):
                                             Not significant
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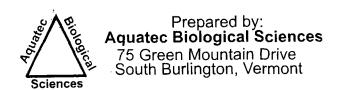
### **Summary of Statistical Analyses**

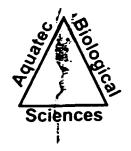
- 1. When the reference site data were compared to each other, Sample 12664 (Prairie Dupont) was shown to have significantly lower Day 28 growth, Day 42 reproduction, and Day 42 growth than Sample 12665 (Prairie Dupont 2).
- 2. When the reference site data were combined and the test sample data were compared to the combined reference site data (with multiple comparison tests), no significant reductions in survival, growth, or reproduction were detected for any of the test samples.
- 3. When individual sample data were compared to individual reference site data, the following significant reductions were detected:
  - a. Sample 12614 (BP3) had lower Day 28 survival than Reference 12665 (PD2);
  - b. Sample 12612 (BP1) had lower Day 42 growth than Reference 12655 (PD2);
  - c. Sample 12614 (BP3) had lower Day 42 growth than Reference 12655 (PD2):
  - d. Sample 12612 (BP1) had lower Day 42 reproduction than Reference 12665 (PD2).

# Results of Chironomus tentans Survival and Growth Sediment Toxicity Tests Conducted on Sediment Samples from Dead Creek / Sauget, Illinois

Reference BTRs 3615, 3622, 3629, 3633, 3641, 3643

Prepared for: Menzie-Cura & Associates 1 Courthouse Lane, Suite 2 Chelmsford, MA 01824





## **Aquatec Biological Sciences**









BTRs 3615, 3622, 3629, 3633, 3641, 3643

PROJECT: 99033

I have reviewed this data package, which was completed under my supervision. This data package is complete, and to the best of my ability, accurately reflects the conditions and the results of the reported tests.

John W. Williams

Toxiefty Laboratory Manager

12/14/Gq

I have reviewed and discussed this data package with the responsible laboratory manager. Based on this review, the data package was, to the best of my knowledge and belief, conducted in accordance with established company quality assurance procedures.

Philip C. Downey, Ph.D.

Director

12/14/99 Date

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EXECUTIVE SUMMARY	1
INTRODUCTION	2
METHODS	2
PROTOCOL DEVIATIONS	3
RESULTS	4
QUALITY ASSURANCE	6

### LIST OF APPENDICES

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APPENDIX B: CHAIN-OF-CUSTODY DOCUMENTATION

APPENDIX C: LABORATORY DOCUMENTATION AND DATA ANALYSES FOR

Chironomus tentans TOXICITY TESTS

APPENDIX D: RESULTS OF STANDARD REFERENCE TOXICANT TESTS

### **EXECUTIVE SUMMARY**

### 100.2CT Midge, Chironomus tentans 10-day Survival and Growth Test Conducted October 7 - October 20, 1999 for Menzie-Cura & Associates

### Dead Creek Site

Laboratory Sample ID	Client Sample ID	Mean Survival (%)	Mean Dry Weight (mg)
12546	BTOX-C-1	30 *	
12547	BTOX-C-2	0 *	
12548	BTOX-C-3	96	2.352
12549	BTOX-D-1	44 *	-
12550	BTOX-D-2	48 *	
12551	BTOX-D-3	71 <b>-</b>	
12552	Laboratory Control Sediment	98	2.558
12589	BTOX-B-1	0 -	
12590	BTOX-B-1 (DUPE)	4 *	
12591	BTOX-B-2	0 -	
12592	BTOX-B-3	100 ¹	0.581 <sup>1</sup>
12593	BTOX-M	96 *	
12609	E-1 Dead Creek	91*	
12610	E-2 Dead Creek	16 <b>*</b>	
12615	Laboratory Control Sediment	100	1.922
12611	E-3 Dead Creek	97	2.240
12612	BP-1 Borrow Pit	64 *	
12613	BP-1 Borrow Pit (DUPE)	40 *	
12614	BP-3 Borrow Pit	53 <b>*</b>	
12622	Laboratory Control Sediment	94	1.761
12638	BP-2 Borrow Pit	14 *	
12639	F-1 Dead Creek Section F	31 *	_
12640	F-2 Dead Creek Section F	16 °	
12641	F-3 Dead Creek Section F	10 *	
12664	Prairie DuPont Creek	16 *	
12665	Prairie DuPont Creek 2	55 <b>*</b>	
12666	Reference Creek	13 -	
12668	Laboratory Control Sediment	100	2.065
12671	Ref 2-2 Reference Borrow Pit	11 *	

<sup>\*</sup> The response data were statistically significantly different from the corresponding laboratory control sediment in < 0.05%

When a statistically significant reduction in survival was detected, mean dry weight data were only reported in Appendix A (See Results)

<sup>\*</sup>Indigenous *Chironomus tentans* were present in this sample, resulting in counts higher than the initial number.

Statistical analysis of test data for Sample 12592 was not performed.

### INTRODUCTION:

Samples were received for toxicity testing at Aquatec Biological Sciences of 75 Green Mountain Drive, South Burlington, Vermont. Tests were conducted at Aquatec Biological Sciences. The results of the following tests are reported:

Client: Menzie-Cura & Associates Facility/Location: Dead Creek / Sauget, IL

Initial Sampling Date: October 4 - October 9, 1999
Testing Date: October 7 - October 20, 1999

Tests Conducted: Midge, Chironomus tentans, 10-day Survival and

Growth

### **METHODS:**

### **Toxicity Tests**

The procedures followed in conducting these toxicity tests were based on methods described by the USEPA (EPA 600/R-94/024). Specific test parameters for the *Chironomus tentans* whole sediment toxicity test are listed in Table 1. Testing was completed in four separate groupings based upon chronological sequencing from the time of sediment collection. The objective for the test groupings was to complete the 10-day acute tests prior to expiration of a 14-day sediment storage time so that subsequent chronic toxicity tests could be started within a 14-day time frame. The first testing group was initiated on October 7, 1999. The second testing group was initiated on October 8, 1999. The third testing group was initiated on October 9, 1999. The fourth testing group was initiated on October 10, 1999. A laboratory control (artificial sediment) was included with each testing group.

### Sediment Preparation

The samples were stored refrigerated and in the dark whenever they were not being used in preparation for testing. Sediments distributed in test beakers were examined for the presence of indigenous organisms which were removed when observed. Also, large pieces of vegetative material (e.g., leaf litter, sticks, grass) were removed. Qualitative observations regarding the sediment type and indigenous organisms removed were recorded. A laboratory

control sediment was used with each Sample Delivery Group. The laboratory control sediment (artificial sediment) was prepared following formulations specified in the USEPA protocols and then hydrated prior to distribution to test chambers. Sediments were then distributed to individual replicate test chambers, overlying water was added, and the overlying water renewal system was activated. The unused portion of each sample (in the original sample container) was returned to refrigerated storage.

### Statistical Analysis

Statistical comparisons were performed against the concurrent laboratory control. The growth measurement was based upon the average dry weight of surviving midge larvae per replicate, following the USEPA protocol for the test method. Statistical significance for any sample is based upon the most sensitive endpoint (survival or growth). An F-Test was performed to test for equality of variances between each sample comparison to the control. If variances were not significantly different, paired T-Tests with equal variances were used to determine whether there were significant reductions in mean survival (Arcsin transformed) and/or mean growth in each sample relative to the control. If the variance between a sample and control comparison was significantly different, paired T-Tests with unequal variances were used to determine significant reductions in mean survival and/or growth.

### **PROTOCOL DEVIATIONS:**

Surviving midge larvae in three test replicates (12640D, 12668A, and 12668B) were not included in the dry weight statistical analysis due to an apparent laboratory error.

Sample 12592 (BTOX-B-3) had greater than ten larvae recovered on Day 10 in seven of the eight test replicates. Several of the replicates had very high numbers (e.g., 18-28 larvae) recovered. Many of excess larvae were very small and appeared to be *Chironomus tentans*. This particular sample had an indigenous population of the test species which contributed to the final count because the test population and the indigenous population could not be easily differentiated. Statistical analysis of this sample (comparison to the Laboratory Control

Sample) was not performed due to the confounding presence of indigenous midge larvae. It was assumed that acute toxicity was not characteristic of this sample. This sediment sample was seived through a 0.3 mm mesh sieve prior to initiating subsequent chronic toxicity testing.

The following test replicates (12593C, 12615H, 12638G, and 12639A) had eleven larvae surviving when the test was ended. Proportion surviving was scored as 1.0 for these replicates.

The following replicates had slight inconsistencies in the number surviving larvae versus the number weighed: Replicate 12593F had nine surviving larvae and eight larvae weighed; Replicatee 12593G had 10 surviving larvae and nine larvae weighed; Replicatee 12666 had three surviving larvae and one larvae weighed.

Large predacious indigenous organisms (dragonfly nymphs and a leech) were found in some test replicates on Day 10. These replicates had no surviving midge larvae, possibly due to predation. The affected test replicates included 12547B, 12547F, 12551E, 12611G, and 12640F. These replicates were excluded from the statistical data analysis.

### **RESULTS:**

Summary result tabulations for the *Chironomus tentans* whole sediment toxicity tests are located in Appendix A.

Group 1 Test Results: This group included Samples 12546 (BTOX-C-1), 12547, (BTOX-C-2), 12548 (BTOX-C-3), 12549 (BTOX-D-1), 12550 (BTOX-D-2), and 12551 (BTOX-D-3). Samples 12546 (BTOX-C-1), 12547, (BTOX-C-2), 12549 (BTOX-D-1), 12550 (BTOX-D-2), and 12551 (BTOX-D-3) had survival responses that were significantly less than the Laboratory Control Sample (12552) which had 98 percent survival. Survival and growth responses for Sample 12548 (BTOX-C-3) were not significantly less than the Laboratory Control Sample. Samples 12546, 12547, and 12549 exhibited acute toxicity and were not scheduled for chronic toxicity testing. Samples 12548, 12550, and 12551 were scheduled for chronic toxicity testing.

Group 2 Test Results: This group included Samples 12589 (BTOX -B-1), 12590 (BTOX-B-1 duplicate), 12591 (BTOX-B-2), 12592 (BTOX-B-3), 12593 (BTOX-M), 12609 (E-1 Dead Creek), and 12610 (E-2 Dead Creek). Survival responses for samples 12589 (BTOX -B-1), 12590 (BTOX-B-1 duplicate), 12591 (BTOX-B-2), 12593 (BTOX-M), 12609 (E-1 Dead Creek), and 12610 (E-2 Dead Creek) were significantly less than the Laboratory Control Sample (12615). The Laboratory Control Sample for this testing group had 100 percent survival, hence no statistical variability in the survival response data. This lack of statistical variability may have had the effect of increasing the sensitivity of the statistical analysis such that samples with high survival (Samples 12593 and 12609 had 96 percent and 91 percent survival, respectively.) were shown to be significantly lower than the Laboratory Control Sample response. Samples 12589, 12590, 12591, and 12610 exhibited acute toxicity and were not scheduled for chronic toxicity testing. Samples 12592, 12593, and 12609 were scheduled for chronic toxicity testing.

Sample 12592 (BTOX-B-3) had indigenous *Chironomus tentans* larvae present in the sediment which confounded the final Day 10 survival counts. Statistical analysis of acute data for this sample was not performed.

Group 3 Test Results: This group included samples 12611 (E-3 Dead Creek), 12612, (BP-1 Borrow Pit), 12613 (BP-1 Borrow Pit duplicate), 12614 (BP-3 Borrow Pit), 12638 (BP-2 Borrow Pit), 12639 (F-1 Dead Creek Section F), 12640 (F-2 Dead Creek Section F), and 12641 (F-3 Dead Creek Section F). Survival responses for samples 12612, 12613, 12614, 12638, 12639, 12640, and 12641 were significantly less than the Laboratory Control sample (12622) which had 94 percent survival. The responses observed for Sample 12611 were not significantly less than the Laboratory Control. Samples 12638, 12639, 12640, and 12641 exhibited acute toxicity and were not scheduled for chronic toxicity testing. Samples 12611, 12612, 12613, and 12614 were scheduled for chronic toxicity testing.

Group 4 Test Results: This goup included samples 12664 (Prairie Du Pont Creek). 12665 (Prairie Du Pont Creek 2). 12666 (Reference Creek). and 12671 (Ref 2-2 Borrow Pit). Survival responses for all four samples were significantly less than the Laboratory Control sample

(12668) which had 100 percent survival. Only sample 12666 exhibited a growth responses that was significantly less than the Laboratory Control. Sample 12665 was scheduled for chronic toxicity testing. Samples 12664, 12666, and 12671 exhibited acute toxicity (defined as <50% survival and/or statistically lower than the control) and were not scheduled for chronic toxicity testing.

<u>Total Ammonia and Sulfide</u>: Total ammonia concentrations were less than 25mg/L in porewater and less than 7 mg/L in overlying water. Total sulfide was not detected (<0.5mg/L) in any porewater samples, therefore, testing for sulfide in overlying water was not conducted.

### **QUALITY ASSURANCE:**

A standard reference toxicant SRT test was conducted for each batch *Chironomus tentans* used in testing. The resulting LC50 values fell within control chart limits and were viewed as being acceptable.

Table 1. Test Conditions for the Midge (Chironomus tentans) 10-day Whole Sediment Survival and Growth Toxicity Test.

ASSOCIATED PROTOCOL: EPA, 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates Method 100 1 (FPA/600/R-94/024)

100.1 (EPA/600/R-94/024).	
1. Test type:	Whole-sediment toxicity (static renewal)
2. Temperature:	23 <u>+</u> 1 °C
3. Light quality:	Wide-spectrum fluorescent lights
4. Light illuminance:	500 to 1000 lux
5. Photoperiod:	16 hr. light, 8 hr. dark
6. Test chamber size:	300 mL beaker
7. Sediment volume:	100 mL (distributed to test chambers on the day prior to administration of test organisms)
8. Overlying water volume:	175 mL
9. Renewal of overlying water:	Twice daily
10. Age of test organism:	3rd instar or younger
11. Number of organisms/test chamber:	10
12. Number of replicate test chambers / treatment:	8
13. Feeding regime:	1.5 mL Tetrafin suspension daily (1.5 mL contains 4.0 mg of dry solids)
14. Aeration:	None unless dissolved oxygen in overlying water drops below 40 % saturation or demonstrates a declining trend during daily monitoring. If required, aeration will be sufficiently gentle to prevent resuspension of sediments to the overlying water. Additional water renewals may be used in lieu of aeration.

Table 1. Test Conditions for the Midge (Chironomus tentans) 10-day Whole Sediment Survival and Growth Toxicity Test (continued).

15. Overlying water: Reconstituted water (EPA/600/R-94/024)

16. Control sediment: Formulated sediment (EPA/600/R-94/024,

Section 7.2.3.2)

17. Test chamber cleaning: None

18. Monitoring:

Overlying water

Temperature Daily Dissolved oxygen Daily

Ha

Beginning and end of test Conductivity Beginning and end of test Beginning and end of test Alkalinity Hardness Beginning and end of test Ammonia Beginning and end of test

Within 2 hours to remove "floaters" Organism behavior

Daily

19. Test duration: 10 days.

Survival and growth (dry weight of larvae to 20. End points:

0.01 mg, 60°C overnight), by replicate

21. Reference toxicant: 96-h acute, water only (KCI)

Minimum mean control survival of 70% 22. Test acceptability:

and performance-based criteria outlined in

EPA/600/R-94/024, Table 12.3

23. Statistical analysis and data

Arc-sine (square-root) transformation of interpretation:

survival data. F-Tests were performed for equality of variance. Paired T-Tests were performed versus the negative control for

survival and growth.

Summary of Statistical Tests and Probabilities
Dead Creek *Chironomus tentans* Acute Toxicity Test
BTR: 3615

			Sur	Survival			Gre	Growth	
		Proportion	F-Test Equal	T-Test Statistical	Statistically	Average	F-Test Equal	T-Test Statistical	Statistically
Day 10		Surviving	Variance	Probability	Significant	Weight (mg) Variance	Variance <sup>1</sup>		Probability Significant
12552	Control	0.98				2.558			
12546	Sample	0.30	0.042	0.000	*	2.905	0.000	0.316	
12547	Sample	00.0	$NA^2$	0.000	*	0.000	NA <sup>2</sup>	NA <sup>2</sup>	*
12548	Sample	96.0	0.757	0.318		2.352	0.051	0.179	
12549	Sample	0.44	0.025	0.000	*	3.021	0.000	0.213	
12550	Sample	0.48	0.012	0.000	*	2.879	0.392	0.026	
12551	Sample	0.71	0.125	0.000	*	3.412	0.033	0.004	

\* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

1. If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

2. There were not enough sample and/or control response variability to conduct a meaningful F-Test

						Day 10	Data			
Sample	Ozakana	Start Count		-	Mean Proportion	Initial Boat Weight	Weight	_	Mean Wt. within Rep	Reps I-L
Number	Replicate		Surviving	Surviving	Surviving	(mg)	(mg)	Weighed	(mg)	(mg)
12552	*	10 10	10	1 00		36 40	50 60	10 10	2.220	
	5		10	: OC		32 D7	61.15 40.30	-	2.908	
	c	10	8	0.80		28 90	49.39	3	2 561	
	C	10	10	1 00		37 56	61.28	10	2.372	
	E	10	10	1 00		25 48	53.70	10	2.422	
	Œ	10	*2	1 00		29 16	54 08	10	2 492	
	G	10	10	1 00		35 09	58.20	£	2.566	
	<u> </u>	10	<u> </u>	1 00	<del>38</del> 3	37 77	57 00	10	2.923	2.558_
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<sup>\*</sup> A indigenous predator was found in the sample during breakdown on day 10. See protocol deviations.

Dead Creek Chironomus tentans Acute Toxicity Test Summary of Statistical Tests and Probabilities

BTR: 3622/3629

			Sur	Survival			Gre	Growth	
		Proportion	F-Test Equal	T-Test Statistical	Statistically	Average	F-Test Equal	T-Test Statistical	Statistically
Day 10		Surviving	Variance	Probability	Significant	Weight (mg) Variance	Variance <sup>1</sup>	Probability	
12615	Control	1.00				1.922			
12589	Sample	00.0	$NA^2$	0.000	*	0.000	NA <sup>2</sup>	0.000	*
12590	Sample	0.04	NA <sup>2</sup>	0.000	*	0.529	900.0	0.003	*
12591	Sample	0.00	NA <sup>2</sup>	0.000	*	0.000	NA <sup>2</sup>	0.000	*
12593	Sample	96.0	NA <sup>2</sup>	0.030	*	1.964	0.447	0.384	
12609	Sample	0.91	NA <sup>2</sup>	0.004	*	1.079	0.373	0.000	*
12610	Sample	0.16	NA <sup>2</sup>	0.000	*	1.501	0.000	0.293	

\* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

1. If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

2. There were not enough sample and/or control response variability to conduct a meaningful F-Test.

Sample 12592 was not included in the statistical analysis. See protocol deviations.

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Summary of Statistical Tests and Probabilities
Dead Creek *Chironomus tentans* Acute Toxicity Test
BTR: 3629/3633

			Sur	ırvival			Gre	Growth	
		Proportion	F-Test	T-Test	Ctatistically	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	F-Test	T-Test	
<b>Day 10</b>		Surviving	Variance	Probability	Significant	Weight (mg) Variance	Equal Variance <sup>1</sup>	Statistical Probability	Statistically Significant
12622	Control	0.94				1.761			
12611	Sample	0.97	0.379	0.160		2.240	0.826	0.031	
12612	Sample	0.64	0.004	0.018	*	2.643	0.027	0.040	-
12613	Sample	0.40	0.012	0.000	*	4.071	0.014	0.001	
12614	Sample	0.53	0.002	0.009	*	2.996	0.016	0.016	
12638	Sample	0.14	0.001	0.001	*	0.956	0.002	0.137	
12639	Sample	0.31	0.005	0.000	*	2.686	0.019	0.042	
12640	Sample	0.16	0.002	0.001	*	0.053	NA <sup>2</sup>	0.000	*
12641	Sample	0.10	0.058	0.000	*	0.969	0.007	0.095	

\* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

1. If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

2. There were not enough sample and/or control response variablility to conduct a meaningful F-Test.

			T -		99033	Day 10	Data			
					Mean	intoal Bost		#	Mean W.	Mear W
Sample		San		Preparation.	Proportion	Weight		Organisms		
Number	Replicate	Count	Surviving	Surviving		(mg)	(mg)	Weighed	( <b>⇔</b> g)	(mg)
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<sup>1.4</sup> indigenous precator was found in the sample ourning presidown on day 10. See protocol deviations

Summary of Statistical Tests and Probabilities
Dead Creek *Chironomus tentans* Acute Toxicity Test
BTR: 3641

			Sur	Survival			Gre	Growth	
			F-Test	T-Test			F-Test	T-Test	
		Proportion	Equal	Statistical	Statistically	Average	Equal		Statistical Statistically
<b>Day 10</b>		Surviving	Variance	Probability	Significant	Weight (mg)	Variance <sup>1</sup>	_	Significant
12668	Control	1.00				2.065			
12664	Sample	0.16	NA <sup>2</sup>	0.000	*	1.052	0.005	0.047	*
12665	Sample	0.55	NA <sup>2</sup>	0.000	*	2.699	0.173	0.024	
12666	Sample	0.13	NA <sup>2</sup>	0.000	*	0.346	0.306	0.000	*
12671	Sample	0.11	NA <sup>2</sup>	0.000	*	1.409	0.004	0.136	

\* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05)

1. If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal va

2. There were not enough sample and/or control response variablility to conduct a meaningful F-Test.

<del></del>						Day 10	Data			
Sample	Replicate	Start Count	# Cumining	Proportion Surviving	Proportion	_	_		Mean Wt. within Rep	Reps I-L
Number	<del> </del>				Surviving	(mg)	(mg)		(mg)	(mg)
12668	A	10	10	1 00				0		
	B	10	13	. 30			F7 F0	0	2 202	
	С	10	10	1 00		35 90	57 53	10	2.063	
	D	10	10	1 00		38 94	64 79	10	2 585	
	E	10	10	1 33		40 44	57 73	10	1.729	
	F	10	13	1 00		36 10	56.71	19	2 061	
	G	10	13	. 00		43 85	60 7 <b>6</b>	10	1 691	
<u>-</u>	#1	10	1C	1,00	100	35 95	59 57	19	2 262	2.065
12554	<b>A</b>	10	G	5 33				O	0 000	
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	С	12	€	0.50		40.00	5€ 4€	£	2 743	
	D	10	S	0.00				C	5.000	
	Ξ	1.0	1	0.10		40 14	43 19	7	3 950	
	F	10	С	0.00				2	000 C	
	G	10	C	0.00				C	2 00C	
	H	10	G	<u> </u>	0.16	<del></del> -		<u> </u>	0 00	1 052
12685	<u> </u>	13	9	0.90		37.51	56 22	<u> </u>	2 079	
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	C	10	8	0.83		32 59	54 27	£	2 7 10	
	D D	10	4	0.40		35 21	54 2. 51 61	4	4 100	
		10	8	0.50		35 84	52 66	8	2.103	
	E F		4	0 <b>3</b> 0 0 <b>4</b> 0		42 47	54 17	4	2.925	
		10								
	G	13	2	0.20	0.55	37.51	42 3E	2	2.385	0.000
	<del>il-fi</del>	10	1	3 10	0.55	36 05	38-61	1	2.560	2.699
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	₽	10	4	0.45		41 DE	46 <del>26</del>	4	1 470	
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12671	•	10	s	3 30				<del></del>	0.000	
(25)	Ä								0 000	
	B	10 10	C	3 6G		,,,,	EE 50	0	0.000	
	C	10	4	3 40		45 24	55 53	4	2 323	
	D	10	C	3 30			4= 00	5	0 000	
	E	10	-	0 10		44 E*	47 60	-	2 990	
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	₩	10	C	0.00	0.11			0	0 000	1,409

### APPENDIX: B

South Burlington, VT 05403 NOTES TO SAMPLER(S): We recommend neating samples in ice to maintain 4°C during 75 Green Mountain Drive TEL; (802) 860-1638 VOLUME/CONTAINER 1YPE/ NUMBER OF CONTAINERS shipment. Please cover sample labels with clear tape (labels are not waterproof) PRESERVATIVE 600 7.0' plastic 1 931 **4**0C Chironomus tentans 10-d Survival & Growth Chnonouns tentims 10-d Survival & Growth Chirononus tentans 10 d Survival & Growth Chronomus fortuns 10 d Sarvival & Growth Chironomus tentans 10 d Survival & Growth Hyalalla aztaca 42. day Chronic Toxicity Hyalalla aztaca 42 day Chronic Toxicity Hyalalla aztaca 42 day Chronic Toxicaty Hynlotta aztoca 10-d Survival & Growth Hyntolla nzlaca 10 d Survival & Growth Hyalalla azlaca 42 day Chronic Toxicity Hyalalla aztaca 10 d Survival & Growth Hyalalla azlaca 42 day Chronic Toxicity Hymbolla aztaca 10-d Survival & Growth Hynlotta nztaca 10 d Survival & Growth Chironomus fortuns Chronic Loxicity Chhononus funtans Chronic Toxicity Chironomus funtains Chronic Toxicity Chironomus fantans Clyronic Toxicity Chironomus tentans Chronic Toxicity ŝ NOTIVE INFORMATION ANALYSIS / IN-MARKS Aquatec Biological Sciences **∀**03 Chain-of-Custody Record Client Code MENGUR Hand Delivered Airbill Number Data Shipped Carrier GRAB | COMPOSITE | MATRIX Sediment Sadiment Project Name Dend Creek Sediment fox COMPANY'S PROJECT INFORMATION Received by (signature) 00033 3/00 Sampler Name(s) Project Number COLLI CTION Quote # Address One Courthouse Lane, Suite 2 COMPANY INFORMATION Contact Name - Ken Ceneto, Ph D Menzig Cura & Associates SAMPLE IDENTIFICATION Chalmsford, MA 01824 (978) 453-7260 (978) 453-4300 Relinquished by; (signifling) Talaphone facsimile.

Name

Notes to Lab: Cooler ambient temperature upon delivery:

Received by: (signature)

Received by: (signature)

00:0 TIME

Relinquished by: (signature)

رت Rel<mark>fra</mark>uished by: (*signature*)

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75 Green Mountain Drive South Burlington, VT 05403 TEL; (802), 860-1638 FAX; (802), 658-3189 VOLUME/CONTAINER TYPE/ PRESERVATIVE plastic 1 gal 40C Š SHIPPING INFORMATION Aquatec Biological Sciences Yes Chain-of-Custody Record Client Code:MENCUR | Hand Delivered: Airbill Number: Date Shipped: Carrier: Dead Creek Sediment Tox COMPANY'S PROJECT INFORMATION Project Number: 99033 3/99 Sampler Name(s): Project Name: Quole #: Address: One Courthouse Lane, Suite 2 COMPANY INFORMATION Contact Name: Ken Cerreto, Ph.D. Menzie Cura & Associates Chelmsford, MA 01824 Facsimile: (978) 453-7260 Telephone: (978) 453-4300

Name:

	Cuole #:	1	J Cilent Code;	MENLUR	JASS Client Code:MENCUK Hand Delivered: Yes No	
SAMPLE IDENTIFICATION	COLLECTION DATE TIME	N E GRAB	B COMPOSITE	MATRIX	ANALYSIS / REMARKS NIMBER OF CONTAINERS	583
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KINX-/20	T/C		/	_	Hyalella azteca 42-day Chronic Toxicity	
J-1-1 2010					Chironomus tentans 10-d Survival & Growth Chironomus tentans Chronic Toxicily	
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2 (1 - 1/1/10	_       		\		Hyalella azteca 42-day Chronic Toxicity / [-0.5]	
ーをJoX ントレ	/-/		7		Chirononnus tentans 10-d Survival & Growth /	
					Chirononnus tentans Chronic Toxicity	
7	,			Sedhnont	Hyalalla azlaca 10-d Survival & Growth	
プレン// ファイノ	(0//0)		_		Hyalella azleca 42-day Chronic Toxicity / 丁二〇 4	
ノンジュー	7/		\	_	Chironomus (entans 10-d Survival & Growth /	-
					Chironomus tentans Chronic Toxicity /	
				Sediment	Hyalella azleca 10-d Survival & Growth	
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			<b>)</b>		Chironomus tentans Chronic Toxicity	
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)			>		Chironomus tentans Chronic Toxicity /	
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76 Green Mountain Drive 17 (15 South Burlington, VT 05403 17 (17 EC) (602) 960-1638

Aquatec Biological Sciences

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COMPANY INFORMATION	·	COMPANY	rs moa	COMPANY'S PROJECT INFORMATION	NOILY	SHIPTING IN	SHIPPING INFORMATION		VOLUME/CONTAINER 1YPL/ PRESERVATIVE	ALICONTAINER	INT R 17	716	
Jame Menzie Cura & Associates		Project Name		Dead Crook Sodiment Tox		Cardor		70¢					
Vidress One Courthouse Lane, Suite 2 Chelinsford, MA 01824 Felephone (978) 453 4300		Projact Numbar Samplar Namo(s)	ber 99033 ne(s)	133		Airbill Number		plastic	<u>.</u>	$\frac{1}{I}$	1	$\frac{1}{1}$	7
				'		Date Shipped			<del>.</del>	<del>'</del>	- <u>!</u> -	$\frac{\perp}{1}$	1
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### CHAIN OF CUSTODY RECORD

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10/6/90		Analysos	Required	CHEL MSFORD, MA 01824 161. 978/453-4300 FAX: 978/453-7260
SAMPLERS CLOW 220, 1. FORMILY.	Popula	W POUR		
SAMPLE ID DATE CORD. Gran	Station Locations	No. of Containers		NOTES
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•		•	N = 1 - 16.25 VG	

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Relinquished By: (Signature)	0		Received By: (Signature)	ignature) 0	Date	Time	Via Feder
Relinquished By: (Signature)		Date Time	Received By: (Signature)	ignature)	Date	Time	
Laboratory: Aguatech			Phone:				
Contact Person: phil Downey	2/12	*					

CHAIN OF CUSTODY RECORD

## CHAIN OF CUSTODY RECORD

		{		COSTODI NECONO	`			
Project No.   Project Name:	-		Project Location:				MENZIE GLIBA & AGGOSTATE INC	
6486 Diad Crook - Souge Men.	C- SAUGEL ME		Sugal-Cohoping, 1111.	hatis.	//		1 COURTHOUSE LANE, SUITE 2	
10 KM (1.1.5)	>		A	Analysos Roquirod	75		CHELMSFORD, MA 01824	
DATE: / D/ 1/			<i>C'</i>	- C			TEL: 978/453-4300 FAX: 978/453-7260	
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Jeny :112 310C

	Project No.	Project Name:	Name:				Project Location:	on:					
	849 849	-	d Se	7	Dead beet - Sauget Avea I		Sauget/Cahollia, III.	/Cah	ollia	111		,	MENZIE-CURA & ASSOCIATES, INC. 1 COURTHOUSE LANE, SUITE 2
		-					6	Analy	'ses Re	quired			CHELMSFORD, MA 01824
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0	Contact Person:	+	Ohil Downey	Down	red								
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### Midge (Chironomus tentans) Day 10 Survival and Dry Weight Data

Client:	Menzie	e-Cura & /	Assoc.			ead Creek er 7, 1999	<del></del>	: 3615 : End: Oc	tober 17,	1999
Sample	Repl.	# Alive	Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12546	Α	4	JG	.0	RB	4	4	36.85	5360	
	В	ユ	36			2	2	40.08	47.98	
	С	2	Im			2	2	35,91	46.39	Acuse
	D	0	3m	0	Im	0	0 -	35,57		ACUSE
$\mathcal{N}$	E	Ö	76			6	6	31.81	51.42	
	F	5	1/g	-		5	S	36.63	49.64	
	G popo	0+17		0	Im		_0	34.45		
<del></del>	H/PP	3+17	RB	0	TM	4	3	30,27	42.24	
12547	Α	0	RB	0	RB	0	0	36,14		
	B ()	0	<u> </u>			0		33.06		Ac
	С		RIZ	0	RB	0		34.95		Aco
$\sim$	D	0	77n			0		33,53		
	E	0	TM		4/0:	<u> </u>		35.VI		
		<b>t</b> s) 0	TM	0	Im	<u>Q</u>		32.94	<del>                                     </del>	
	G	0	7G	0	Im	0		34.10	<del>                                     </del>	
	Н	0	RB	6	JG-	0		31.73	1	ļ
12548	Α	10	TM			10	10	30,00	56.51	
	В	10	1G			70	10	27.30	49.64	
	С	10	7m			10	iO	29.43	58.90	Chro
D	D	0	Tm			0	Large 18	ch present	<u> </u>	('N'
	E	8	JG			8	8	28.53	45.64	
	F	9	RB			9	cj		151.70	
	G	10	RB			10	[0]	29.98	42.54	
	H	10	RB			10	10	32.39	59.33	
12549	A۱۶۰۶۹	4+14)	RB	O	RB	5	4	32.45		
	В	_5	RA	-		2	5 337	32.60	55.07	N = 11
,	С	-8	RB	0	RO	0	0			VC or
<b>V</b> .	D		7m			8112	8	32.59	57.67	Oir
	E	4	m			4	4	31.68	52.76	
	Floup	3+119	30			Z41G		34,21	47.00	
	Gldes		00	1	00	<del>                                     </del>	3	32.60	41.17	
	H	5	RB		RB	6 10 67	10/22	39.91	43.43	
Balance (	30. J-33	ial (20 mg ≈	10.01	, <u> </u>	<u>In. 7</u> (20 mg =		1428	: Asset #:		

Reviewer: Date: 12/10/89.
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

(#2) Draganfly nymph pre sent 10/12 JM

(1)

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000017

### Midge (Chironomus tentans) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3615
	Test Start: October 7, 1999	Test End: October 17, 1999

					Repick	Total		Init Pan	Total	
Sample	Repl.	# Alive	Init.	Repick #	Init.	Surv	Weighed	Wt.	Dry Wt.	
12550	Α		516-			1		32.87	35.62	
j	BIZA	2	RB	!		2	2	31.55	36.98	
	Clóca	19	36			9+8	9	29.56		•
	D	4	RB			4	4	39.14	48.55	Chimic
Y	Ε.,	4(100		Hi jekous.		4	4	27.05	38.51	
ľ	FIRST	3 Birse	ひし			<b>3</b> 419	3	33,26	43 44	
	G"	6	ユロ			9)	6	27.47	44-63	
	Н	8	1G			8	8	25.50	52.40	
				<del></del>						1
12551	Α	7	<u> </u>			7	7	32.77	52 89	
	В	4	k iz			! 4	7 -	34.14	20.83	61 - V
Gu gart	C	6	RB	<del>-</del>		6	6	34.26		Choone
1000	_	8849				9	9	34.46	62.72	l
l y	E (I)	Ŏ	JG			C	9	32.67		
'	F	8 14	RB			8	8,16	32,67	58.07	
	GIF	167	16			7	9	32,61	54 47	
	H	4	RB			9	9	38.67	62 2 G	
12552	Α	10	RB			1.5	10	28 Hs	1.0 (0	
12552	В	10				(0)	10	38.40 32.07	60.60	
Idad -	Cu	8	<u> </u>			28	8	28.90	61.15 49.39	Chisnic.
1000	D	10	JG-	<del></del>			IC		(61.28	(10.4
	E	10_	R\$	<del></del>		10	10	29 112	53.70	
	F	10	ত্র					29.16	54.08	
	Gra	9+12	16			. 10	2109	25 19	58 20	
1	Н	0	16			$\frac{10}{10}$	10	37,72	6700	
	<del>''' '</del>		70	·		10		<u> </u>	<u>(4700</u>	
	Α			· ·				ų į		
	В			,						
	С					·				
1	D			•					[	
	E							1		
	F			<del></del>				-		
	G			<del></del>		<del></del>		<del>,</del>	<del> </del>	
	Н				<del></del>			<del>-</del>		
<del></del>				<del> </del>			<del>!</del>			

Final (20 mg =

Date/time out

Comments:

(1) One Odanata found (predator.) 10/18/17 16

Reviewer (2) Nine larva weighed: correction
Laboratory Aquatec Brological Sciences. South Burlington Vermon 12/10/94 16
12/10/99

init.

Initial (20 mg =

Temp(°C)

Baiance QC:

Date/time In

ctsurvwt.doc

Init.

Balance Asset #:

Temp(°C)

### Chironomus tentans Head Capsule Width

Culture ID: <u>9/25, 9/26, 9/27</u> Age (d) of larvae: <u>10-12 days</u>

Magnification: 32 Ocular micrometer calibration: 35 micrometer units = 1 mm

Microscope Asset #: \_\_2929\_\_

Calculation of head capsule width:

head capsule width (micrometer units) / micrometer calibration units

Organism Number	Head Capsule Width (micrometer units)	Head Capsule Width (mm)
1	14	0.40
2	14	0.40
3	28	0.80
4	25	0.71
5	12	0.34
6	27	0.77
7	13	0.37
8	14	0.40
9	14	0.40
10	12	0.34
11	13	0.37
12	13	0.37
13	14	0.40
14	14	0.40
15	14	0.40
16	15	0.43
17	- 10	0.43
18		-
19	-	_
20		_
20		
Initials: JWW	Larval heads were severed and mour	nted on a slide for measurement.
Date:	Subset of larvae used to start Sam	ples 12546, 12547, 12548,
12/10/99	12549, 12550, 12551, 12552 on 1	0/7/99.

Reviewer: jww Date: \_\_\_\_.
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Egg Deposit Date: C	Larva	riation Date: 957	Culture ID	9 27
Culture Source (flies)	Aquated	No Egg Cases	s: 3	

Instructions: Isolate egg cases in petri dish with sediment recon, water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed daily increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry / change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accompdate larval growth. When emergence occurs remove files daily to mating flask or disposal flask. Remove discarded body castes.

۽ ۽ ۽								
Date	Day	Temp pH	DO	Cons Fed	WC	Observations		Init.
9,32	Ĉ			Se .				Tm
7175	ű .			ોં		S-11 renth	.νς	
2/26		213		~c:		To me - 20	Darin	
ئ ز ر ن	7	ı		TIL		ج تين و <sup>د</sup> اجد برو		
/s /,	4			Telia				JG
11/2					ے عبدار			TIG
ڊ <sup>/</sup> يد	ئ			- ES	7			JĠ
16	7			70				76
15	Ē			TC			<u>^_ :</u>	<u> </u>
:/4	ą	22.7 7.9	g. Ç	//_		To 10 000	£ -19/200	lese -
1=17	/5					<u></u>		<u> </u>
1-17	Test	572.75	Sames	.2546 /	2547	12508 2509	12000	12537
	·			222		<del></del>	·	· ·
				<u>.</u>				<u>:                                 </u>
								<u> </u>
	·							<u> </u>
			<u> </u>					· 
								·
			*					

Egg Deposit Date: 9	123 Larva	el Hatch Date: 926	Culture ID:	9/2(0
Culture Source (flies)	Aquatec	No. Egg Cases:	3	

Instructions: Isolate egg cases in petri dish with sediment recon. water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed daily increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry / change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accomodate larval growth. When emergence occurs, remove flies daily to mating flask or disposal flask. Remove discarded body castes.

Date   9 26   9 27	Day	Temp	рН	DO	Cond	Fed	WC	Observations	Init.
<del></del>				İ		sel	<del></del>		m
9/12/						sei			m
9/28	2						78		10
9/29	3				;	TC,		2 450 /2/VZE	5
9/30	4					P/14	/ec		133
10/1	-					Tale	115 170		176
10/2	G			 	<del></del>	TC			136
10/2	7					70	<del></del>		Ha
10/4	8					FC _			HR
15/5	9				•	90			1
10/6	10	228				16		Combined w/ 9/27 Culina	
10/7	//								
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						}	1		
				Ī					1
						Ī	<u> </u>		

Egg Deposit Date 9	a) Larva	Haish Date 9 25	Culture ID:	9125
Culture Source (fires)	Aquated	No Egg Cases:	2	

Instructions: Isolate egg cases in petricish with sediment recon, water. Hold in petricish up to two days or until arval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water and Selenastrum. Feed daily increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry: change 80% of water weekly. Measure temperature daily in one representative outure. Spirt outures if needed to accompdate larval growth. When emergence occurs, remove files daily to mating flask or disposal flask. Remove disparded body castes.

Date	Day	Temp	рН	20	Cons	Fed	WC	Observations	lnit.
9125	0					sei			17m
1.545	1					SEI			Im
<u> جي د</u>	ŝ					Seit	<b>4:5</b>	added Sand Z	Tm
9/25	3_					Se: 1-	こ	Grown so Erral	
وزانا	4					تني سب			
4/30	7								
1=/1	6					TCI	ofic		JG
الادر	7_					ے میا	- -		30
<u> </u>	Ģ					ےمب			<u> </u>
12/5	9								JE
10/5	_/>_								1G
من 1 <u>1 1 ر</u>	<u> </u>	22.9	_						
10/7	12								Ĭ
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		<del>-,</del>							
			- <del></del>						

# Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

						Day	Day of Analysis	ysis		•		
Sample	Parameter	0	-	2	6	4	5	9	7	8	6	10
12546	T (°C)	23.2	4.E.	33.0	22.2	23.4	7. CC	73.7	22.9	724	27.8	27.00
	Hd	4.8	×	×	×	×	7.5	×	×	×	×	4
	DO (mg/L)	(0.5	6.1	55	5.3	56	5.4	4.5	4.7	5,0	2,9	1 A
	Conductivity	350	×	×	×	×	370	×	×	×	×	350
	Ammonia, alk/hardness Sulfide	>	×	×	×	×	×	×	×	×	×	>
12547	(°C)	23.3	J3.2	12. P. C.C.	23.9	24.0	21.9	22.6	おナ	22.8	279	8.CC
	Hd	7.8	×	×	×	×	7.S	×	×	×	×	4,4
-	DO (mg/L)	6,3	5.6	8.8	0.0)	5.7	5.4	0	5.5	5,4	60	らる
-	Conductivity	360	×	×	×	×	370	×	×	×	×	370
	Ammonia, alk/hardness Sulfide	/	×	×	×	X	×	×	×	×	×	>
12548	T (°C)	23.3	23.2	tee.	5.KC	923.3	22,4	223	6'EE	32,8	1.8%	22.8
	Hd	7.8	×	×	×	×	7.4	×	×	×	×	St
	DO (mg/L)	6.4	5.4	5.6	4.9	4.4	4.3	4.6	4.1	4.5	0,0	4.4
	Conductivity	350	×	×	×	×	385	×	×	×	×	390
	Ammonia, alk/hardness Sulfide		X	×	×	×	×	×	×	×	×	
	Init./Date (1999):	10/16	1 <b>%</b>	76/01	81/61	18/1	21/15	19/13	18/16	45.65	19/16	10/17

Review: Date: (2/0/95 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

1630-1800

55/1/01

1CST SRUT

Comments:

# Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

Day of Analysis  0 1 2 3 4 5 6 7 8  3.3 9 33.1 33.8 33.7 32.9 32.7 33.0 32.9 32.9  3.6 0	Project: Menzie-C	Project: Menzie-Cura & Associates	Project:	ect: 99033	ĺ	Dead Creek			BTR: 3616	1	Test Starts 877/99	7/99	
T (°C)   33 q   33 1   2   3   4   5   6   7   8							Day	of Anal	ysis				
T (°C)   33.9   33.3   33.8   33.7   33.9   32.7   33.0   32.9	Sample	Paramotor	0	1	2	က	4	2	9	^	8	6	9
DO (mg/L) 6 9 6 3 6 0 5 3 4 9 4 9 6 5 1 5 2 2 Conductivity 3 6 0 0 5 2 4 9 4 9 4 6 5 1 5 1 5 2 2 4 9 4 9 9 4 6 5 1 5 1 5 2 2 4 9 9 9 4 9 9 9 9 9 9 9 9 9 9 9 9 9	12549	T (°C)	6 EE	1.88	9:KC			7.cc.	.23.0	229	600	28.6	6,00
DO (mg/L)  Conductivity  Condu		Ŧ.	2 t	×	×	×	×	76	×	×	×	×	9/t
Conductivity 36.0 X X X X X X X X X X X X X X X X X X X		DO (mg/L)	5.9	6.3	0.0)	<i>ان</i> دز	2		4	7.	7	77	<b>~</b> } ~ ` `
Armmonia, aikthardness  T (°C)  A 3 0 23 A 73 9 2 A 23 0 24 A 1 A 2 A 2 A X X X X X X X X X X X X X X X		Conductivity	360	×	×	×	-×	2/0	×	×	×	×	300
T (°C)		Armmonia, atk/hardness Sulfide	>	×	×	×	×	×	×	·×	×	×	2
DO (mg/L) (3.0 GO 5.2 49 4.2 46 4.3 4.1 5.3 Conductivity 370 × × × × × × × × × × × × × × × × × × ×	12550	T (°C)	43.0	~	73.9	~∩		22.4	1. 5.7.	Tec	23.62	600	23.1
DO (mg/L) (2.0 6.0 5.2 4.9 4.2 1.6 4.3 4.1 5.3 Conductivity 370 × × × × × × × × × × × × × × × × × × ×		Ha	· ·	i	×		×		×	×	×	×	7.5
Conductivity 370 X X X X X 370 X X X X X X X X X X X X X X X X X X X		DO (mg/L)		60	57	4.9	4.7		4.2	4		2,9	42
Animonia, alkhardness		Conductivity	370	×	×	1	×	1	×	×	×	×	380
T(°C) 22.9 23.4 25.4 23.2 23.1 22.3 23.6 23.0 23.3 29.9 DO (mg/L) 5.7 × × × × 7.6 × × × × × × × × × × × × × × × × × × ×		Ammonia, alk/hardness Sulfide	>	×	×	×	×	×	×	, ×	×	×	>
7.7 × × × × 7.6 × × × × × × × × × × × × × × × 3.4 0 × × × × × × 3.4 0 × × × × × × × × × × × × × × × × × ×	12551	T (°C)	23.9	33.4	456		33.1	$\mathfrak{t}$ $\mathcal{C}$	ی	J.53.C	23.3	22.9	1.2c
360 × × × × 310 × × × × × 310 × × × × × × × × × × × × × × × × × × ×		Ha	4.	×	×	×	×	76	×	×	×	×	76
360 X X X 310 X X X X X X X X X X X X X X X X X X X		DO (mg/L)	5.6	50		るい	<del>4</del> N	4	4.4	4.8	4.8	43	4.3
19(7, 19/8, 19/10, 10/11, 19/12, 19/13, 19/14, 19/15		Conductivity	360	×	×	×	×	3.10	×		×	×	390
1972 1978 1970 1971, 19712 1973 19714 19415		Ammonia, alk/hardness Sulfide	>	×	×	×	×	×	×	×	×	×	>
		Init./Date (1999):	35	<sup>1</sup> %	<b>1</b> %	19/19	19/1/	19/12	1913	19774	10 10 10 10 10 10 10 10 10 10 10 10 10 1	18 4.84 4.45 4.45	1975

Comments:

Review: Date: (2/10/64
Laboratory: Aedatec Biological Sciences, South Burlington, Vermont

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

Review: Date: 17/0/29
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Comments:

### Midge (Chironomus tentans) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3622 / 3629
	Test Start: October 8, 1999	Test End: October 18, 1999

2590 A E ()	A B C D E F G H	000000	TM RB TM TM TM TM RB RB TM			000000000	To the second se	38.84	40.32	Acuraly
2590 A E (	C D E F G D E D E F G F C D E F G G F G G F G G F G G F G G F G	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	RB TM TM RD TM RB RB TM			00000		38.84	40.32	anly
2590 A E (	D E F G H B C D E F G G	0 0 0 0 0 0 0 0 0 0	RB TM TM RD TM RB RB TM			00000	John Town	38.84	40.32	and
2590 A E (	E G H B C D E	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	TM TM TM TM TM RB RB TM			0000 10		38.84	40.32	and
2590 A E (	E G H B C D E	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	TM RB RB TM			0 0 0		38.84	40.32	
2590 A E C E	F G H A B C D E F	0 0 0 0 0 0 0 0	TM RB RB TM			0 0		38.84	40.32	
2590 A E C E	A B C D E F G	0 0 0 0 0 0 0	TM RB RB 7M			0 0		38.84	40.32	_
2590 A E C E	A B C D E F G	0 0 0 0 0	TM RB RB 7M			0		38.84	40.32	
2590 A	A B C D E G	0 0 0	TM RB RB 7M			10	81	38.84	40.32	,
E [ E - -	B C D E F	0	RB 7m 7m				181	38.84	40.32	ļ
E [ E - -	B C D E F	0	RB 7m 7m					1	_	^
[ [ [	C D E G	ပ 0	7m 7m							
	D E F G	ပ 0	7m 7m			$\supset$				ابا ورا درما
	E F G_	0	TM			C	<u> </u>			رحرط
	<u>G</u>		<del> </del>	~		$\overline{\mathcal{O}}$				
	<u>G</u>		7m			$\delta$				
		6	76			$\frac{\overline{\varsigma}}{\overline{\varsigma}}$		<del> </del>		
		7	7G			3	2	2969	3.5.20	
		<u>~</u> _				$\mathcal{O}$	00	1 1 4	100.0	
2591 /	A	0	7m			0	1	1		
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+	D	0	JG			0				1700
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	F	0	76-				<u> </u>			
4	G	0	FM		~			-		
-	H	O	36			<u> </u>		<del></del>		ı
								·	48.11	(th
		3120ge(6,4)	<u>"</u> <u>J</u> C	<u>Ø</u>		13	13	36,37	48.11	Sieve
<del></del>	В	3 4 25				78	28	1.7.7.00	45.42	Exces
<i>4</i> (	C (****	18	YM.			8	18	32.71	37.38	وبعديها
	المنا ال	#	RB			11	11	39.20	48.63	Chipos Chipos
<u> </u>	E	18	JG-			18.	ig	142.72	173.33	Creni
124 2 F	FSMI"	15	नार			15	15	34.39	52.14	
<b>★</b> (	<u>G 5-58</u>	<u> </u>	RB			<u> </u>	11	39.29	41.62	1 ~ <i>D</i> 4
. 1	Himi	8	RB			8	8	3596	39,40	indig
alance QC		ial (20 mg =			(20 mg =			Asset #:		40
		is Temp(°	c) 81,	Init. 7m		ime out	7 1	mp(°C) &4		7G-
omments:							97			
_		/	/a -			Someli	123 34	<b>^)</b>	er dio o d in the	
eviewer		Date 11/10	9/ <i>99</i> es, South Burlin	ncton Vermont		STE	ind Co	. م. ٠	er de	tsurvwt doc
Licially Mil	maser OK	myria scend	E3, 300111 33 III	g-wi. venight	660	3.70 1	ادر المادة	, v Sara (	1 1	Histell

### Midge (Chironomus tentans) Day 10 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3622 / 3629
	Test Start: October 8, 1999	Test End: October 18, 1999

					Repick	Total	#	Init Pan	Total
Sample	Repl.	# Alive	init.	Repick #	Init.	Surv	Weighed	Wt.	Dry Wt.
12593	Α	9	TM	-		9	9	33.78	51.62
	В	9	Im			9	9	43.18	60.67
	С	11	76			il	[]	36.03	57.58
	D	10	RB	-		10	0	35.15	50.58
<b>!</b>	E	10	19			10	10	40.43	60,22
İ	F	109	3CM		·	109 RS	8	35.86	50,59
Ì	G	10	TM			10	9	35.16	56,80
	Н	10	RB			10	10	36.52	57.14
		-2	00					0: 2:	0.50
12609	A	8	RB			8	8	31.56	39.77
	В	1.7	RB			10	<u>i0</u>	31.99	42.69
1	C	10	RB			10	10	32.11	41.76
othor	<u></u> D.	8	TM			8	8	32.66	37.061
	l <del>-</del>	10	TM			10	10	38.79	53.66
	FIPIP	9	RB				8		89.99
(	G	9	16			3	9	27.38	<i>35</i> , 53
<u> </u>	Н	9	16			9	9	26.07	38.09
12610	Α	à	TYE		<u></u>	入 一	2	32.27	41.92
12010	В	$\frac{\sim}{\sim}$	10				<u> </u>	99.80	11.10
	C	7	Tm			$\circ$		33.52	
	D	$\frac{\widetilde{7}}{7}$	Tm			i	1	34.50	39.01
	E	0	m					32.86	71.01
	F	1	im			1	<u> </u>	34.19	34.92
	G	Ö	RB			0		2408	
	H	9	76	_		9	9	32.34	49,85
12615	Α	10	RB		_	10	10	28.81	48.78
1	В	10	76			10	10	31.95	53.69
	С	10	m			10	<u> </u>	33.29	51.53
	D	10	RB			0	10	27.77	41,70
	E F	10	<u>JG</u>			10	10	27.97	52.01
		10	7m			10	10	34.55	53,20
<b>\</b>	G	!	RB			//		27.97	45.71
1	Н	10	9G			10	10	29.90	50.95

Balance QC: Initial (20 mg = (9.98)	) Final (20 mg = $1998$ )	Balance Asset #:
Date/time In Wil 17:15 Temp(°C) 81°	Init. 7h Date/time out 11/7	30 Temp(°C) 84 Init. JG
Comments:		14

Reviewer: 1 Date: 12/10/99. Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctsurvwt.doc

Egg Deposit Date: 0123	Larva	Haton Date: 936	Culture II	): 9/a(a
Culture Source (flies).	Aquated	No Egg Cases:	_3	

instructions: Isolate egg cases in petri dish with sediment recon, water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed cally increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry: change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accompdate larval growth. When emergence occurs, remove files daily to mating flask or disposal flask. Remove discarded body castes.

Date	Day	Temp   pH	<b>33</b> Con	d Fec	WC	Observations	Init.
9/20	0			<u></u> ⊱€1			m
0 22	j			sei			m
9/28	7			cul-	<u> بر ح</u>		σ
91:0	3					= Lie iivae	J-
9/30	6	!	- <del></del>	-26/4	100	:	33
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Egg Deposit Date: ११३	4 Larval Hato	ch Date: 9/27	Culture ID:	9/27
Culture Source (flies):	Aquatec	No. Egg Cases:	3	

Instructions: Isolate egg cases in petri dish with sediment recon, water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed daily increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry / change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accomodate larval growth. When emergence occurs, remove flies daily to mating flask or disposal flask. Remove discarded body castes.

1999

1777										
Date	Day	Temp	рН	DO	Cond	Fed	WC	Observations	Init.	
9127	0					Isei.	{		Im	
9/28	<u> </u>					Sel		Still herrhing		
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10/1	4			]					JJG	-
10/2	15					TCIO	Y-1-C-		MG	
14/3	6	1				TO 01			JG	-
10/0	7					HC			HA	<u>_</u> _
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Egg Deposit Date	9/25 L	arval Haton Dat	e 9/28	Culture ID.	9128
Culture Source (fires	\ Aquate	s No	Egg Cases	34	

Instructions: Isolate egg cases in petri dish with sediment recon, water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed daily increasing amounts of Cerophyll-Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry I change 80% of water weekly. Measure temperature daily in one representative duture. Split cultures if needed to accompate larval growth. When emergence occurs, remove fires daily to mating flask or disposal flask Remove disparaded body castes.

Date	Day	Temp	- pH	20	Cond	Fed	WC	Observations	init.
Date Date Gile	٥					٤1.			7727
6 16	ļ		1			46-		STU FREELING TERMS	47
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#37.						7011			_JG-
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,10	<u>ئ</u>					700			JE
	_ ?					17	<u> </u>	To promise tex	135
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3.7	<u> </u>					TC			Arr
12:5	<i>1</i> 3							Used for TELT STARTS	7
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### Chironomus tentans Head Capsule Width

Culture ID: 9/26, 9/27, 9/28 Age (d) of larvae: 10-12 days

Magnification: 32 Ocular micrometer calibration: 35 micrometer units = 1 mm

Microscope Asset #: 2929

Calculation of head capsule width:

head capsule width (micrometer units) / micrometer calibration units

Organism	Head Capsule Width	Head Capsule Width
Number	(micrometer units)	(mm)
1	8	0.23
2	11	0.31
3	14	0.40
4	7	0.20
5	13	0.37
6	7	0.20
7	15	0.43
8	14	0.40
9	15	0.43
10	14	0.40
11	14	0.40
12	14	0.40
13	13	0.37
14	15	0.43
15	15	0.43
16	-	
17	-	-
18	-	-
19	-	-
20		_
Initials: JWW	Larval heads were severed and moun	ted on a slide for measurement.
Date:	Subset of larvae used to start Sam	ples 12589, 12590, 12591,
12/10/99	12592, 12593, 12609, 12610 on 10	0/8/99.

Reviewer: <u>jww</u> Date: \_\_\_\_. Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

・ は	roject: Menzie-(	Project: Menzie-Cura & Associates		Project: 99033		Dead Creek			BTR: 36	22 / 3629	Tost St	BTR: 3622 / 3629 Tost Starts 8/8/99	6
Parameter   0	:						Day	of Ana	lysis				
DO (mg/L)  DO (mg/L)  TO 5. 76.0 5.7 5.7 5.7 5.2 6.0 6.3 7.7 5.8 × × × × × × × × × × × × × × × × × × ×	Sample	Parameter	0	-	7	က	4	2	9	7	8	6	9
DO (mg/L) 7.0 5.76.0 5.7 5.7 5.2 6.0 6.3 7.7 5.6.  Conductivity 3.70	12589	T (°C)	4.1%	368	35.6		23.2	23.2	22.91	8 4	223	1.50	229
DO (mg/L)  Oconductivity  Annuonia, alkhardness  Annuonia, alkhardness  Annuonia, alkhardness  DO (mg/L)  T (°C)  T (°		Hď	4.9	×	×		×	4.4	×	×	)  ×	×	3 5
Conductivity 370 × × × × × × × × × × × × × × × × × × ×		DO (mg/L)	7.0	7	0 %		4.4	くい	0.0	7	Ĺ		40
T (°C)   21,7   25,7   23,2   23,9   23,0   23,9   23,5   23,2   23,8     T (°C)   21,7   25,7   25,7   23,2   23,9   23,0   23,9   23,5     DO (mg/L)   7,9   5,7   6,0   5,4   5,7   6,1   7,0   5,4     Conductivity   360		Conductivity	3.5	` ` `	×			390	×	) ×	÷×	× 2	700
T(°C) 21,7 25,745.7-33,2 229 23.0 23.4 22.5 22.2 22.8 - PH  DO (mg/L) 7,2 5,7 6.0 5,4 5.6 5.4 5.7 6,1 7,0 5.4		Ammonia, alk/hardness Suffide	>	×	×	×	×	- ×	×	×	×	×	250
DO (mg/L) 7.5 5.7 6.0 5.4 5.6 5.4 5.7 6.1 7.0 5.4 X X X X X X X X X X X X X X X X X X X	12590	T (°C)	71.7	2,7	45.7	33.2		23.0	2.4	8	22.2	7	228
Conductivity 360 × × × × × × × × × × × × × × × × × × ×		Hd	19 E		×	×		4 4	×	×	×	×	アレイ
Conductivity 360 × × × × × × × × × × × × × × × × × × ×		DO (mg/L)	7.	5.7	6.0	17.	ر) کا	4.7	5.7	_ 	7,0	5.4	10
Arimonila, aikthardness  T ("C)  A], U  ASC 33, U  A3, U  A3, U  A3, C		Conductivity	3%0	×	×	×	<b>×</b>	710	×	-    -	×	×	300
T("C) 21.4 25.6 23.1 23.0 23.8 22.5 22.8 22.9 22.9 22.9 22.9 22.9 22.9 22.9		Ammonia, alk/hardness Sulfide		×	×	×	×	×	×	×	×	×	7
1.6 × × × × + + × × × × 7.6 6 × 6.9 6.9 6.4 6.3 1.4	12591	T ("C)	7).1%	356	S. S.	23.(	44.9	23.0	22 X	25.5	8,56		22.9
360 X X X X X X X X X X X X X X X X X X X		H	76	×	×	×	×	4.4	×	×	×	×	7
360 × × × × × × × × × × × × × × × × × × ×		DO (mg/L)	7.4	6,3	6.6	6.4	97	6.6	6.7		4.4		()
1982 - 1982 1983 1984 1985 1983 1985 1983 1983			2/60	×	<b>×</b>	×	×	390	×	×	×	×	ν Ø
1982-198 1973 1974 1978 1974 1975 1975 1975			/	×	×	×	×	×	×	×	×	×	,
			1385	<b>%</b>	15.75 25.75 75.75	19/11	19,12	19/13	19//14	5 25 25	\$ \$ \$ \$ \$	19/17 19/17	10/18

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Review: Date:  $\frac{12/(s/5)}{2}$  Date: All Date: 12/(s/5) Laboratory: Aduatec Biological Sciences, South Burlington, Vermont

Comments:

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

Day of Analysis  4	ect: Menzie-C	Project: Menzie-Cura & Associates	. Project:	ect: 99033	1 1	Dead Creek			BTR: 36	22 / 3629	3622 / 3629 Test Starts	arts 9/8/99	g
Parameter   0   1   2   3   4   5   6   7   8   9     T (°C)							Day	of Anal	lysis				
T (°C)   2 .9   28.0   28.3   23.4   23.9   23.0   23.0   23.0   23.4     PH	Sample	Parameter	0	-	2	က	4	5	9	7	8	6	9
Do (mg/L) 65 55 5.7 57 6.6 4.7 4.5 5,5 6,6 5.5 6.7 6.5 6.6 6.5 5.5 6.6 5.5 6.6 5.5 6.6 6.5 5.5 6.6 6.5 6.5	12610	T (°C)		790.0	202	33.	23.3	23.4	9.86	23,0	نہ ا	23.	223
DO (mg/L) 6.5 5.7 5.7 6.6 4.7 4.5 5.5 6.6 5.5 5.5 Conductivity 4/0 × × × × × × × × × × × × × × × × × × ×		Н	54	×	×	×	×	70	}	×	×	×	7
Anmonia, alkihardness  Anmonia, alkihardness		DO (mg/L)	65	52	4	45	6.6	4.7	4.5		6.6	5.5	6,0
Ammonia, alkhardness  Ammonia, alkhardness		Conductivity	01/2	×	×	×	×	420	×	×	×	×	12
T (°C)		Ammonia, alk/hardness Sulfide	7	×	×	×	×	×	×	×	×	×	/
36	12615	T (°C)		764	7	·	23.3	335	·	23.0		73.7	37
8.1 64 6.3 6.3 6.4 6.1 6.1 6.2 7.1 6.6 38		Н	,	×			×	77	×	×	×	×	7.7
30 × × × × × × × × × × × × × × × × × × ×		DO (mg/L)	1	40)	6.3	6.3	6.4	6.1	6.1		4	0.0	1
		Conductivity	R	×	×	×	×	4(0	×	×	×	×	200
		Ammonia, alk/hardness Sulfide	_	×	×	×	×	×	×	×	×	×	7
1986   1986		T (°C)											
1986   1987   1987   1988		Hd		×	×	×	×		×	×	×	×	
X X X X X X X X X X X X X X X X X X X		DO (mg/L)											
X X X X X X X X X X X X X X X X X X X		Conductivity		×	×	×	×		×	×	×	×	
1986 1995 1997 1997 1997 1999 1999 1995 1996 1997		Ammonia, alk/hardness Sulfide		×	×	×	×	×	×	×	×	×	
		Init./Date (1999):	1389	10%		19/11 WW	19/12	19W3	1974	(4)	1968 878	1977	10/18

Review: Date: (2//0/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Comments:

Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3629 / 3633
	Test Start: October 9, 1999	Test End: October 19, 1999

Sample	Repl.	# Alive	Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12611	Α	i O;u	-m		~	10,	10	38.81	60.20	
	В	809	TM		<b>\</b>	819	9	48.33	63.29	
	С	10	RB			70	10	39.77	63.67	10
	D	9	<u> </u>			9	9	35.30	57 97	phionic
	E	iĆ	AS		_	10	10	47.71	65.44	(1)
1 1	F	iO	RB RB			10	10	40.74	63.70	
predator	G¥	U			<b>-</b>	0		43.13		
	Н	10	m			10	10	34.78	63. 76	
40040			0.0			(A)	<del></del>	44 27	60 64	ŀ
12612	Α	5	15			2	5	44.27	60.54	
	В	10	RB			10,	10	48.19	67.85	10
	C D	\$	16			46		41.87	66.59	Chichic
	<u> </u>	6	RB Tm			Ö	6	47.59	69.61	(n
	E F G H	7	7m			7	7	51.61	72.60	
	<u>-</u>	10	35			10	10	4792	75.43	
	<del></del>	5 pip	$\overline{m}$			5	5	47.38	64.22	
								1111111111	01.22	
12613	Aldad	1 44	RB	_	_	In	1	146.77	53.48	•
	В	89	TM			89	9	45.64	66.77	/
	C D	7	TM		_	7	7	44.80	71.69	()3
		<u>a</u>	m			。 る	a	42.20	47-83	Chrows
	E	_3	Try			_3	3	51.92	63.36	C.
ŀ	F	<u> </u>	<i>Y</i> S_			6	(a	50.58		
İ	G		<u>77n</u>				1	50.02		
L	Н		R&				3	50.43	64.61	
12614	Δ	10	46	·	<del></del>	10	1C	44.77	71.48	
12614	R	10	RB			10	10	59,26	92.75	
	C	6	RB			6	6	57.85	81.44	10
	D	0	<b>2</b> 8			. 0	<u> </u>	1-1	31. 1	10/2000
		T T	īm			<del>'</del> /	1	46 29	49.18	
	F	3	( E			3	3	53.44	64.53	
	A B C D E F G H	G	95			10	<u> </u>	51.31	71.82	
	Н	(0	Thi			6	G	55.17	79.23	
	·			<del></del> -						•

Balance QC:	Initial (20 mg	= 1999		Final (2	20  mg = 19.99	) Balance Asset #:	
Date/time In	7 14-30Temp(°	c) Taic	init.	Tm	Date/time out	Temp(°C)	Init.
Comments:	11/8/99	20 mg	=	19.995		<del></del>	

Reviewer Date 12/0/90
Laboratory Aquatec Biological Sciences, South Burlington Vermont

ſ	Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3629 / 3633
9		Test Start: October 9, 1999	Test End: October 19, 1999

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Sample	Repl.	# Alive	Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12622	Α	101	RB	_	_	10	10	53.37	73.08	
	В	10	36				10	59.34	68.47	]
	С	9	TM			109	9	51.16	64.49	10
	D	10	TM			10	10	56.01	76.25	Chronic
	E	8	Tm			8	8	58.63	71.84	(h)
	F	9	16			4	9	56.14	78.78	
	G H	9	16	-		9	9	55.87	73.42	
		10	16			10	10	47.21	63.02	
12638	Α	0	TM			0				
	BO	(I dead)	76	_		<b>©</b>				
	С	0	JE			O,				٠, ,
	D	0	TM			<u> </u>				Acust
	E	Q	TM			<u> </u>				only
19294	F	0	RB			0	~	= 4 4 5	22 74	ď
18.4.	G ⋆ H	1	RB		-		- 4	51.79	56.77	
<u> </u>	11		45					1.51.71	00,11	
12639	Α	[] [] sha	m		_	П	11	43.47	65.09	
	В	2 slive/12	ext 16			9	à	52.88	60.89	1
!	С	0.	TM			0				Acut
	D	3	B.B.			_3	3	60.46	69.50	inly
	E		KB			4	1	53.50	56.38	
	F bead G	4 m	Tm			TAN	4	42.20	54.77 56.05	
	Н	4	77n R.B			4	4	53.72	64.49	·
		_,	1/12					10 31 1-4	01.11	
12640	Α	0	76			0				
!	В	0	TM			0_				Acrino
,	С	0	76			0				Aconomics * Only min
	D	10	16			(0		37.48		ال من م
unata	E F*K	$\frac{Q}{Q}$	TM			$\frac{0}{2}$				
operata	G	9	UK!					29.53	29.90	
	Н	0	$-\frac{\partial}{\partial m}$					27.33	21.10	
			. (11			$\underline{\hspace{0.1cm}}$	L			1

ſ	Balance QC:	Initial (20 mg =	9.99	) Final	(20  mg = 19.99)	) Balance Asset #:	
•	Date/time In II	7 16⋅30 Temp(°C)	72°C1	nit. 7m	Date/time out	Temp(°C)	fnit.
۲	Comments:						

Reviewer: Date: (2/14/29).
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3629 / 3633
	Test Start: October 9, 1999	Test End: October 19, 1999

Sample	Repl.	# Alive	lnit.	Repick #	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	
12641	Α	0	RB		~	Ó				
ł	В	6	Je	-		G	6	36.19	48.88	
	C D E F G	Ī_	$\mathcal{I}m$			1		50.62	54.64	Δ.
	D	$\mathcal{C}$	777i			0				fc in
	E		RB			1		4197	43.59	~ىن
	F	Ò	TM			0				ì
	G	0	R.B			0				i
	H	$\Box$	45			0				ł
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	C							1		
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	C						1	<del> </del>		1
	D			/			<u> </u>	!		1
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	F				<del></del>		1	<del></del>		1
Ī	B C D E F G	<del></del>	7	<del></del>	<del></del>	·—	1	1	<del></del>	1
Į.	Н								i	}

Balance QC: Initial (20 mg =	1994	)	Final	20  mg = 549	) Balance Asset #:	
Date/time In 间子 心 上Temp(°C	) まて	Init.	Īn	Date/time out	Temp( <sup>c</sup> C)	Init.
Comments:						

ctsurvwt.doc

### Chironomus tentans Head Capsule Width

Culture ID: 9/28, 9/29 Age (d) of larvae: 10-11 days

Magnification: 32 Ocular micrometer calibration: 35 micrometer units = 1 mm

Microscope Asset #: 2929

Calculation of head capsule width:

head capsule width (micrometer units) / micrometer calibration units

Organism	Head Capsule Width	Head Capsule Width
Number	(micrometer units)	(mm)
1	7	0.20
2	15	0.43
3	13	0.37
4	15	0.43
5	7	0.20
6	13	0.37
7	14	0.40
8	14	0.40
9	13	0.37
10	7	0.20
11	14	0.40
12	7	0.20
13	16	0.46
14	6	0.17
15	7	0.20
16	13	0.37_
17	14	0.40
18	13	0.37
19	14	0.40
20	13	0.37
Initials: JWW	Larval heads were severed and mour	lted on a slide for measurement.
Date:	Subset of larvae used to start Sam	ples 12611, 12612, 12613,
12/10/99	12614, 12622, 12638, 12639, 126	40, 12641 on 10/9/99.
L	<u> </u>	

Reviewer: <u>jww</u> Date: <u>\12/10/29</u>
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

cthdcapw10999

### Chironomus tentans Culture and Pre-test Environmental Conditions Data

Egg Deposit Date: 9,	ନ୍ଦ୍ର Larva:	Haton Date: 9/28	Culture ID:	9128
Culture Source (flies):	Aquated	No. Egg Cases:	34	

Instructions: Isolate egg cases in petri dish with sediment recon, water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed daily increasing amounts of Cerophyl/Metrafin slurny to match consumption rates (food should not accumulate). Measure water chemistry I change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accompdate larval growth. When emergence occurs remove files daily to mating flask or disposal flask Remove disparaded body castes.

_Date	Day	. Temp	рн	DC_	Cond	Fed	WC	Observations	lnit.
Date OY	0		i			Se	<u>:</u>	·	777
916						100	:	S-L' razina	100-217-1
5 5 3	-					ئے تام		1 200 /2/22	<u>'</u>
12%	-					7010			JG
2/7	6					TC	برسارته		76
. /3	<u>.</u> -					TCI	TTC		<u> </u>
116	<u>ن</u>					700			J <del>C</del>
10 15	7				-	17		To most a bo	, 16
147	Ģ	219	77	- 4					· · · · · · · · · · · · · · · · · · ·
2.7	s					TC			PP
277 278	7 S							Used for TelT	WI Ever
10/9	l.					TC		Used by	THE STROKE (
								BTR 3629/3	'c <u>3</u> 3
									1

### Chironomus tentans Culture and Pre-test Environmental Conditions Data

Egg Deposit Date: 9/20	Larva	l Hatch Date:	Culture ID:	-9/29
Culture Source (flies):	Aquatec	No. Egg Cases:	2	

Instructions: Isolate egg cases in petri dish with sediment recon. water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed daily increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry / change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accomodate larval growth. When emergence occurs, remove flies daily to mating flask or disposal flask. Remove discarded body castes.

Date	Day	Temp	рН	DO	Cond	Fed	WC	Observations	Init.
9/29	0					Sch,		- Smill box	
9/30	1					150/1	CC.	Observations  -> Smill box  Tuber brains  tubes Visible	
10/1	3					TC 11	<i>C</i> .	tubes Visible	-1JG
10/2	3					TClic	0		JG
13/3	4					TC1,9	TC		196
12/4	5					TC 07			136
13/5	6					TC			IG
10/6	7	22.7	3.1	8.2		TC		To la hox	1
10/7	8					TC		U	Im
10/2	9					TT			Tm
10/9	10					10		Used for Test Some. B-R 3629/3633	40
	11							B-R 3629/3633	5
	12								
	13				•				
	14								
	15								
	16								
{	17								
	18								
	19								
	20								
	21								
	22								
	23								
	24								
	25								

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

roject: Menzie-(	Project: Menzie-Cura & Associates	Project:	ect: 99033		Dead Creek	: : :		BTR: 36	3629 / 3633	Test	Starts 10/9/99	66
						Day	of Analysis	ysis		:		
Sample	Paramoter	0	-	2	က	4	သ	9	^	8	6	5
12611	T (°C)	232	つこで	21.6	31,0	200	33.3	23.3	23.3	23.4	23.3	23,4
	Hď	7.7	×		×	×	7.5	×	×	×	×	7/6
	DO (mg/L)	- 17. O	رب ق	40,4	5.1	<u>7</u>	- 4	7	7	4	40	2 \ \ \
	Conductivity	101	×	×	- ×	`×	360	×	) ×	×	×	; ~
	Armnonia, alk/hardness Suffide	Ž	×	×	×	×	×	×	×	×	×	ر بر
12612	T (°C)	77 66	5 7	カス	3.16	21.1	~~	0%	2236	<u>5</u>	224	5
	Hd	36	 	.×	) <u>′</u> ×	×	- ) +	; ×	× ک	×	×	776
	DO (mg/L)	S S S S S S S S S S S S S S S S S S S	<u>ر</u> ق	7.3	5	0 )	. A.	75	6.5	ル 4	19%	7.7
	Conductivity	40	×	×	×	×	390	×	×	×	×	7.7
	Ammonia, alk/hardness Sulfide	7	×	×	×	, **	×	×	×	×	×	2/2
12613	T (°C)	BAR	4.16	21.6	7.7	٦.١%	73.7	230	23.2	23.3	33.3	1) (1)
	Hď	000	×	×	×	×	7.7	×	×	×	×	7
	DO (mg/L)	C 0	6,0	7.5	6,6	5.9	5.1	15	6.0	0, 4	5.3	5
	Conductivity	430	×	×	×	×	370	×	×	×	×	3.79
	Armonia, alk/hardness Suffide	7	×	×	<b>×</b>	×	×	×	×	×	×	1
	Init./Date (1999):	1.00	<i>?</i> 3/6₁	F1761	1918	19/13	19/14	\$7%i	9) 9) 9)	13/17	10/18	10/19
										6		

Comments:

Review: Date: 12/0/69
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

# Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

Project: Menzie-C	Project: Menzie-Cura & Associates	Project:	ect: 99033		Dead Creek			BTR: 36	29 / 3633	3629 / 3633 Test Starts 10/9/99	urts 10/9/	66
						Day	Day of Analysis	ysis				
Sample	Parameter	0	-	2	8	4	22	9	7	8	6	10
12614	T (°C)	23.0	21.6	7,20	71.4	21.2	23.2	23,1	23.7	23.3	73.3	150
	Hd	4.9	×	×	×	×	7.6	×	×	×	×	1.1
	DO (mg/L)	6.6	7	45	7	5.5	大大地	85	6	1	47	7
	Conductivity	400	×	×	×	×	385	×	×	×	×	3/0/
	Ammonia, alk/hardness Sulfide	7	×	×	×	×	×	×	×	×	×	
12622	T (°C)	230	21.7	215	21.3	21.2	33.5	23.2	23.3	235	33.3	733
	Hd	7.6	×	×	×	×	± ±	×	×	×	×	76
	DO (mg/L)	7.6	45	7.8	4.0	7.1	5.2	45	6.9	5-3	(-0)	6.0
	Conductivity	430	×	×	×	×	340	×	×	×	×	125
	Ammonia, alk/hardness Sulfide	7	×	×	×	X	X	×	×	×	×	)
12638	T (°C)	N.O.	21.6	970	21,5	21.3	33.4	23.0	73.4	33.4	43.4	3.4
	Н	4.9	×	λX	X	×	47	×	×	×	×	7.6
	DO (mg/L)	6.7	71	44	4.0	6.1	4	1.0 1.0	2	4.7	42	2,2
	Conductivity	400	×	×	×	×	375	×	×	×	×	360,
	Ammonia, alk/hardness Sulfide	7	×	×	×	×	X	×	×	×	×	7
	Init./Date (1999):	10%	30,00	15 X	1992	19/13	10/14 10/14	19/15	19/16	19/1/2	10/18	10/19
					1							

Comments: Test Size 10/9/69 1700 - 2130(

Review: Date: (2//0/92 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

haenv.doc

# Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

Day of Analysis  10 1 2 3 4 5 6 7  20 21.621.7 20.12 23 4 23.3 23.3 23.3 23.2 23.2 23.2 23.	Project: Menzie-	Project: Menzie-Cura & Associates	Project:	ect: 99033	4	Dead Creek			BTR: 36	3629 / 3633	Test Starts	ins 10/9/99	66
Parameter 0 1 2 3 4 5 6 7 7 1 (°C)							Day	of Anal	ysis				
DO (mg/L) 5.0 (5.2 6.5 6.4 5.7 4.6 6.8 6.6 6.6 6.3 0.0 0.0 0.4 0.5 6.4 5.7 4 6 6.8 6.6 6.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Sample	Parameter	0	1	2	င	4	S	9	7	æ	6	10
DO (mg/L) 5.2 (c, 2 6.5 6, 4 5.7 4 6 6.8 6.6 6 6.8 x x x x x x x x x x x x x x x x x x x	12639		30.0	31.6	717		212	234	M	23	733.3	4,4	77 1
DO (mg/L) 5.0 (6,2,6,5,6,4,5,7,4,6,6,8,6,6,6,8,8,1,1,1,1,1,1,1,1,1,1,1,1			46	×	×		×	St		×	×	×	1
Conductivity 350 X X X X X X X X X X X X X X X X X X X		DO (mg/L)	30	73	6.5	6.4	S. Y	4	ص ص	0	4.4	7 7	4.7
Arrimonia, alkihardness  T (°C)  DO (mg/L)  DO (mg/L)  DO (mg/L)  DO (mg/L)  Sulfide  T (°C)  Arrimonia, alkihardness  Arrivoria, alkihardness  Ar		Conductivity	28C	×	×	×	×	360	×	×	×	×	>7.
T (°C) 23  33.0 34.6 21.5 21.1 233 23.2 33.2 33.2 33.2 33.2 33.2	,	Armnonia, alk/hardness Sulfide	3	×	×	×	×	×	×	×	<b>×</b>	×	, )
DO (mg/L) 6.3 6.3 7.0 6.15 5.4 1.2 6.7 6.4 Conductivity 385 x x x x x x x x x x x x x x x x x x x	12640	T (°C)	23.		91 18	71.5	1 1 /2	13.2	23.2	0.80	232	د ډر	7.7
DO (mg/L) 6.3 6.3 7.0 6.15 5.1 1.2 6.7 6.4  Conductivity 38.5 × × × × × × × × × × × × × × × × × × ×		Hd	12.60	×	×	×	×	7.6	×	×	) ×	×	15/
Conductivity 350 X X X X 3120 X X X X X 3120 X X X X X X X X X X X X X X X X X X X		DO (mg/L)	63	6.3	7,0	ر ق ا	\ \ \	۲.	6.7	6, 4	4.5	1.5.	0.53
Annmonlia, alk/hardness		Conductivity	88. 88.	×	×	×	×	144	×		×	×	3,50
T (°C)		Anymonia, aik/hardness Sulfide	7	×	×	×	×	×	×	×	×	×	,/
75	12641	T (°C)	4.50	816	たけ	21,3	21.2	\	78,1		23.4	733	P.CC
53 65,6 6.56,0 48 45 6,4 6,3 4 //20 × × × × 310 × × //20 × × × × × × × × × × × × × × × × × × ×		Hd	45	×	×	×	×	7.5	×	×	×	×	7.5
1/20 × × × × 310 × × × 1/20 × × × × 1000 × × × × × × × × × × × × ×		DO (mg/L)	100	50 50 50 50		ف	<u>^</u>	<u>م</u> ار:		! _	4.5	5.3	\$\$ 5.0
1000 10010 10012 10013 19014 10015 1001B 190		Qunductivity	420	×	×	×	×	310	×	×	<b>×</b> _	×	3,0
1000 1000 10012 1013 1914 1045 1018		Ammonia, alk/hardness Sulfide	7	×	×	×	×	×	×	×	×	×	7
1012 101 101		Init./Date (1999):	20	**************************************	18/3	1918	10/13	19/14	1992	10/18	1917	10/18	10/19

Review: Date: 14/0/29 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3641
	Test Start: October 10, 1999	Test End: October 20, 1999

Sample	Repl.	# Alive	Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	]
12664	A		16			5 0			T	
12001	В	7	TM			7	7	35.61	53.98	Acore 56 Ary
	С	6	LS			6	6	40.14	43.194	56 Agry
	D	Ö	<u> </u>			0		40.00	6	1
	E		RB				1	40 00	56.46	143.19 One
	F		10			0_				Lu III
	G	0_	RB			0_				
	Н	0	TM			0				J
12665	Α	9	RB	-	_	9	9	37.51	56.22	10
	В	8	RB	_		8	8	37.80	59.66	CHRUNIC
	С	8	Th			8	8	32.59	54.27	
	D	9	76			7	4	35.21	51.61	
	E yeard	8	TM			8	8	35.84	50.66	
	F G	<del>7</del> 2	70			4 2	<u>4</u> ス	42.47	54,11	
<b>.</b>	Н	7	TM			1	<u> </u>	37.61 36.05	78.61	
<b>/</b>								36.00		1
12666	A		LS			1	1	36.63	37,52	
. 16.3	В	4	77/		~	4	4	41.08	46.96	Acute
1:420	С	3	RB			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	10	37.66	37.81	Acute
	D E	-7-1	Tm			3	1 0	40.29	40.50	oneg
Z Chiroway	F		12					39.29	39.34	1 only
Z Chirology of author st.	G	0	RB	_		$\mathcal{O}$				present 119
	Н	Ö	th			TIMO				71.
12671	Α	0	40							•
12071	В	0	36			$\frac{0}{0}$				۸ . ـ۷
!	C	4	75			<u> </u>	4	46.24	55,53	Acure
	D	0	TM			0			35,33	UNLY
	Ε				_	$\overline{}$		44.61	47.60	*
	E' Serg	3	RB	-		3	3	46.30	55,50	
	G		Tm					40.12	43,01	
	Н	0	36			0				

	Balance QC:	Initial (20 mg =	20.01	)	Final (2	0 mg = 20.01	) Balance Asset #: v^7	<i>७</i> ड	
line.	Date/time In it	q ۱،4:∞Temp(°C)	91,0	Init.	7m	Date/time out 11/	0.163 (Temp(°C) \$70)	Init. ر, /	
	Comments:					19.47	19.97		
,	Reviewer:(	Date: 12/19	499			/		000044	

ctsurvwt.doc / Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99031 Dead Creek	BTR: 3641
	Test Start: October 10, 1999	Test End: October 20, 1999

Sample	Repl.	# Alive	Init.	Repick#	Repick Init.	Total Surv	# Weighed	Init Pan Wt.	Total Dry Wt.	€ No
12668	Α	10	TM			10	OD	37.31		() No.
	В	0	125			10	00	39.88	اسب	سيا
	С	10	Tm			10	10	36.90	\$7,53	) 0
	D	10	16-			10	10	38.94	64.79	CITA
	E	10	36			ID	10	40.44	1 > 1.73	1
	F	10	RB		- :	10	10	36.10	34.71	1
	G	10	RB			16		43.85	60.76	7
	Н	10	7m			10	10	3695	5957	Ţ
	<u></u>			<del></del>						1
	Α		[		•					}
:	В							<u>/</u>		Ţ
	С						$\perp Z$	P B		1
	D									1
	E									1
	F			:				<u> </u>		Ţ
;	G									Ţ
	Н									Ţ
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	В									Į .
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1	Н			1			<del>                                     </del>		†	1

Balance QC	Initial (20 mg = ਕੋਪੋ ਨਾ	)	Final (20 mg = $2\varepsilon c$ )	Balance Asset #:		_
Date/time In	Temp(°C)	Inrt	Date/time out	Temp(°C)	Init.	
Comments.						

Reviewer \_\_\_\_\_ Date 12/10/90 ctsurver doc

### Chironomus tentans Head Capsule Width

Culture ID: <u>9/30, 10/1</u> Age (d) of larvae: <u>9-10 days</u>

Magnification: 32 Ocular micrometer calibration: 35 micrometer units = 1 mm

Microscope Asset #: 2929

Calculation of head capsule width:

head capsule width (micrometer units) / micrometer calibration units

Organism Number	Head Capsule Width (micrometer units)	Head Capsule Width (mm)
1	6	0.17
2	7	0.20
3	8	0.23
4	7	0.20
5	8	0.23
6	7	0.20
7	8	0.23
8	14	0.40
9	8	0.23
10	14	0.40
11	14	0.40
12	14	0.40
13	7	0.20
14	7	0.20
15	7	0.20
16	6	0.17
17		-
18	-	-
19	-	
20	-	-
Initials: JWW	Larval heads were severed and moun	
Date: 12/10/99	Subset of larvae used to start Sam 12671, 12668 on 10/10/99.	ples 12664, 12665, 12666,

Reviewer: <u>jww</u> Date: <u>[2/6/99]</u>
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

cthdcapw.101099

000046

### Chironomus tentans Culture and Pre-test Environmental Conditions Data

Egg Deposit Date: 9,	27   Larval Hatch Date	Culture ID: 9/30
Culture Source (flies):	Aquated No. Eg	g Cases: /

Instructions: Isolate egg cases in petri dish with sediment recon, water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of Selenastrum prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and Selenastrum. Feed daily increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry / change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accompdate larval growth. When emergence occurs, remove flies daily to mating flask or disposal flask. Remove discarded body castes.

Date	Day	Temp	рН	DO	Cond	Fed	: WC	Observations	Init.
9/3e	0		<u>i</u>			(ei	1	-27there - sail bev	
10/1	1	 				TCI	6	table visible	JG
10/2	. 2	1			<u>.</u>	TOIL	C	Edded Line Sono	
12/3	3	1	<u> </u>		<b>.</b>	101,0	<u>. i</u>	<u> </u>	<u> </u>
بنالح	4	h .	 		-	101,00 191,00	<del>Va</del>		136
12/5	5	:				TC 8	17-	<u>:</u>	10
12/6	5	122.8				ن ج:	1/		
15/7	7					TC	<u> </u>		17M
13/8	8	:				TC	<b>\</b>	Transect Thinly son	31.
149	9			··		TC	. [		JG-
12/12		22.0				TC		TEST STETT 10/10/90 7	- TM
1	11	<u> </u>					:		
	12	: 4							
	13						- · · · · · · · · · · · · · · · · · · ·	-	
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	22						·		
	23			<u> </u>					
	24						<del></del>		
	25				. <u></u> .				

### Chironomus tentans Culture and Pre-test Environmental Conditions Data

Egg Deposit Date: 9/29	Larval Hatch Date: /o//	Culture ID:	10/2 10/10	
Culture Source (flies): Aqu	atec No. Egg Cases:	4		

Instructions: Isolate egg cases in petri dish with sediment recon. water. Hold in petri dish up to two days or until larval hatching begins. Add mono-layer of *Selenastrum* prior to hatching. Transfer egg cases with hatching larvae to culture box with mono-layer of fine sand, water, and *Selenastrum*. Feed daily increasing amounts of Cerophyll/Tetrafin slurry to match consumption rates (food should not accumulate). Measure water chemistry / change 80% of water weekly. Measure temperature daily in one representative culture. Split cultures if needed to accomodate larval growth. When emergence occurs, remove flies daily to mating flask or disposal flask. Remove discarded body castes.

Date	Day	Temp	рΗ	DO	Cond	Fed	WC	Observations	Init.
10/1	0				1	tel		hatching	176
16/2	1					TC 1.1			IJG
10/3	2					TC lich	}	added fine said	176
10/4	3					TCNO	-		136
	4					(	D		
10/6	5	<u> </u>		<u> </u>	<u> </u>	TC		Many rubes	
10/7	6				<u> </u>	TC			m
10/8	7					TC			m
10/9	8					70			IG
10/9	9	23.3				ナこ		TEST SETS 10/10/9507	777
10/11									1
<u> </u>	11								
	12			<u> </u>			<u> </u>		<u> </u>
	13			<u> </u>	,				
	14			<u> </u>			<u> </u>		
	15								
	16	,	<u> </u>	<u> </u>			<u> </u>		
	17			<u> </u>	<u> </u>		<u> </u>		
	18			ļ	<u> </u>				1
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	22				<u> </u>				
	23	ļ			<u> </u>				
	24						<u> </u>		<del> </del>
	25						1		

# Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

Project: Menzie-	Project: Menzie-Cura & Associates	Project:	act: 99033	ì	Dead Creek			BTR: 36	3641 Test Starts 10/10/99	Starts 10	/10/99	
						Day	of Analysis		<b>43643</b>			
Sample	Parameter	0	-	2	ဗ	4	S.	9	7	8	6	10
12664	T (°C)	3.55	2/.8	7.79.	9) 66	13.4	43.7	22.4	72.7	2.5	27.4	72.7
	Hď	) %	×	×	×	×	7	×	×	×	×	72
	DO (mg/L)	7.4	6.7	ر ق	ë.	0.0	<u>ر</u>	4	مر کا	5.6	ز	X',
	Conductivity	390	- ;×	×	×	×	3.5	- - -	×	×	2 ×	
	Ammonia, alk/hardness Suifide	/	×	×	×	×	×	×	×	×	×	9)
12665	T (°C)	22.6	ケス	22.6	(, (')	677.4	74%	22.5	330	ح.در	7,00	227
	Hd	7.7	;×	×		×	<b>(</b> €	×į	: :×	×	×	17
	DO (mg/L)	6.4	6.	5.6	5.5	- S -	(T)	7.66	\(\frac{1}{2}\)	1	2	77
	Conductivity	0/12	×	×	×	×	00)5	×	×	×	×	30
	Anunonia, alk/hardness Suffide		×	×	×	<b>×</b>	×	×	×	×	×	7
12666	T (°C)	22,5	216	325	6.56	£.cr/	y CC	22.3	23.0	726	427	22.3
	Ħ	7.5	ا بح	×	×	×	1	×	×	×	×	125
	DO (mg/L)	5,0	4.6	23	4.	28	<del>ي</del> ئ	6,3	5	۲,0	50	E S
	Conductivity	430	×	×	×	×	350	×	×	×	×	385
	Ammonia, alk/hardness Suifide	7	<b>×</b>	×	×	×	×	×	×	×	×	
	Init./Date (1999):	16/2	10,17	19/13	19/13	19/14 7/7	1975 200	50) 50)	19/17 7/	10/)8	10/19	10/20
			t		>	6			<b> </b>			

& Bave 12664 On ATTG MONUAL renewal 10/14 10:00 for Toss START 10/10/98 - 2002 1700 - 1700

Review: Date: 12/10/69
Laboratory: Aquatec Blological Sciences, South Burlington, Vermont

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Comments:

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Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Acute Tests

Project: Menzie-Cura & Associates	ura & Associates	Project:	ect: 99033		Dead Creek			BTR: 36	11 Test S	3641 Test Starts 10/10/99	10/99	
						Day	Day of Analysis	ysis				
Sample	Parameter	0	1	2	3	4	2	9	7	80	6	10
12661 उड	T (°C)	8.08	2) {c	22.4	-4.6C	22.4	22,3	22,7	23.	拉	1.26	227
Ť	Hd	かと	×	××	×	×	7.8	×	×	×	×	42
	DO (mg/L)	土坑	0,0	17.6	5.2	4.7.	71.9	89	(0.1	2.9	5.7	アイ
	Conductivity Je	1400 A	×.	×	×	×	360 36	×	×	×	) >	290
	Ammonia, alk/hardness Sulfide	>	×	×	×	×	×	×	×	×	×	1
12668	T (°C)	tet	215	J.CC	47.55	22.4	MA	22.7	23.2	4r	P.CC	27.9
	Hd	££	×	×	×	×	875	×	×	×	×	72
	Do (mg/L)	700	6.0	5.8	5.8	5.9	83	7.3	5.9	49	/ /	6
	Conductivity	430	×	×	×	×	380	×	×	×	×	24
	Ammonia, alk/hardness Sulfide	7	×	×	×	×	×	×	×	×	×	6
	T (°C)											
	Hd		×	×	×	×		×	×	×	×	
	DO (mg/L)											
	Conductivity		×	×	×	×		×	×	×	×	
	Ammonia, alk/hardness Sulfide		×	×	×	×	×	×	×	×	×	
	Init./Date (1999):	1967	1974	13 25 4	19//3	10/14N	(1) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A	10/16 (a)	19/17	10/18	10/49	10/20 //
		)				6						*

Review: Date: 12/0/95
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Comments:

### **ALKALINITY & HARDNESS WORKSHEET**

 BTR Number:
 Several
 Project # 99033
 Analyst:
 LS

Species Chronomus tentans Analysis

Test Facility Aquated Biological Sciences South Burlington, Vermont Date: 10/13/99

Project Menzie-Cura Dead Creek Acute Tests

			ALI	KALINIT	1		HA	RDNESS	
	Sample	Sampl	ntial	Fina!	Alkalinity	Sample	Initial	Final	Hardness
Date	Type	-	1	TT.	img/L)	mj	ml	m	(mg/L)
10/07/99	1 <b>2546</b> Day 3	50	123	13.5	30 0	50	16 4	23 1	134 0
10/07/99	12547 Day C	50	13.5	15.3	36 0	50	23 1	28 7	1120
10/07/99	12548 Day 3	50	153	57 D	34.0	50	28 7	346	118 0
10/27/99	12549 Day 3	50	C	18 7	34 D	50	34.5	406	120.0
19/07/99	12550 Day 3	50	18 7	20.4	34 0	50	40.5	48 5	118 0
10/07/99	12551 Day 3	25	20.4	22 2	72 D	50	D 5	€ 3	114.0
10/07/99	12552 Day 3	50	22 2	24 0	36 0	50	€ 3	12.7	128 0
10/08/99	12589 Day 3	50	24 0	25 4	28 D	50	12.7	19.0	126.0
1070 <b>8/99</b>	12590 Day 3	50	25.4	26.9	3D D	50	19 0	25.5	130.0
10/08/99	12591 Day 3	50	26 9	28.3	28 0	50	25.5	49.3	476.0
10108/99	12592 Day 3	50	28 3	29.9	32 0	50	1.6	7.3	126.0
10/08/99	12593 Day 3	50	29 9	31.3	28.0	59	7.3	13.2	118.0
10/08/99	12609 Day 3	50	313	33 0	34 0	50	13.2	20.0	136 0
10/38/99	12610 Day 3	50	33 0	34 4	28 0	50	20 0	27.8	156.0
10/08/99	12615 Day 3	50	34 4	35 9	<b>30</b> 0	5C	27.8	34.0	124.0
10/09/99	12611 Day 3	50	37.8	39 B	40 D	50	30.2	37.4	144.0
10/09/99	1 <b>2612</b> Day 0	50	39 8	418	40.0	50	37.4	45 0	152.0
10/0 <del>9/9</del> 9	12613 Day 0	50	41.5	43 7	38 C	50	0.8	ê 0	164.0
10/09/99	12614 Day 0	50	C 4	25	42 0	50·	90	16 5	150.0
10/09/99	12622 Day 0	50	2 5	44	38 D	50	165	24 1	152.0
10/09/99	12638 Day 0	50	44	6 6	44 D	50	24 1	32.2	162.0
16/09/99	12639 Day 0	51	€ €	83	34 0	5E	32.2	38.6	128.0
10/09/99	12640 Day 0	50	E 3	10.0	34.0	50	38.E	46 1	150 0
10/109/99	12641 Day 3	50	100	12 0	40.0	30	0.5	5 2	153 3
10/13/99	12664 Day 3	50	35.9	372	2 <del>6</del> 0	50	34 8	42 0	160.0
10/10/99	12665 Day C	50	37.2	39.2	40 0	50	0.8	7.9	142 0
10/10/99	1 <b>2666</b> Day 0	50	39 2	41.5	46 D	50	79	160	162.0
10/10/99	12668 Day C	50	41.5	43.4	38 D	50	1 <del>6</del> 0	23.5	150.0
10/10/99	12671 Day 0	50	43.4	44 9	30 D	50	23.5	30.2	134.0

### **ALKALINITY & HARDNESS WORKSHEET**

BTR Number: Several Project #: 99033 Analyst: LS

Species: Chironomus tentans Analysis

Test Facility: Aquatec Biological Sciences, South Burlington, Vermont Dates: 11/21/99 12/2/99

Project: Menzie-Cura Dead Creek Acute Tests 12/7/99

				ALi	KALINIT	,		НА	RDNESS	; ]
		Sample	Sample	Initial	Final	Alkalinity	Sample	Initial	Final	Hardness
	Date	Туре	ml	ml	ml	(mg/L)	ml	mi	ml	(mg/L)
	10/17/99	12546 Day 10 CT	50	33.4	35.3	38.0	50	8.1	15.8	154.0
	10/17/99	12547 Day 10 CT	50	35.3	37.7	48.0	50	15.8	23.2	148.0
	10/17/99	12548 Day 10 CT	50	37.7	39.4	34.0	50	23.2	29.9	134.0
	10/17/99	12549 Day 10 CT	50	39.4	41.1	34.0	50	29.9	38.0	162.0
	10/17/99	12550 Day 10 CT	50	41.1	42.9	36.0	50	38.0	45.8	156.0
	10/17/99	12551 Day 10 CT	50	42.9	44.7	36.0	50	0.1	8.1	160.0
	10/17/99	12552 Day 10 CT	50	44.7	46.5	36.0	50	8.1	15.7	152.0
	10/18/99	12589 Day 10 CT	50	15.9	17.9	40.0	50	19.6	28.4	176.0
	10/18/99	12590 Day 10 CT	50	17.9	19.9	40.0	50	28.4	36.9	170.0
	10/18/99	12591 Day 10 CT	50	19.9	21.9	40.0	50	36.9	45.4	170.0
	10/18/99	12592 Day 10 CT	50	21.9	23.8	38.0	50	0.1	8.6	170.0
	10/18/99	12593 Day 10 CT	50	23.8	25.7	38.0	50	8.6	17.8	184.0
	10/18/99	12609 Day 10 CT	50	25.7	28.1	48.0	50	17.8	25.4	152.0
	10/18/99	12610 Day 10 CT	50	28.1	30.0	38.0	50	25.4	33.8	168.0
	10/18/99	12615 Day 10 CT	50	30.0	31.3	26.0	50	33.8	41.7	158.0
	10/19/99	12611 Day 10 CT	50	43.0	44.6	32.0	50	6.9	14.0	142.0
	10/19/99	12612 Day 10 CT	50	44.6	46.4	36.0	50	14.0	20.4	128.0
	10/19/99	12613 Day 10 CT	50	46.4	48.2	36.0	50	20.4	26.8	128.0
	10/19/99	12614 Day 10 CT	50	0.3	2.2	38.0	50	26.8	33.2	128.0
	10/19/99	12622 Day 10 CT	50	2.2	3.9	34.0	50	33.2	39.8	132.0
	10/19/99	12638 Day 10 CT	50	3.9	5.5	32.0	50	39.8	46.5	134.0
	10/19/99	12639 Day 10 CT	50	5.5	7.4	38.0	50	0.1	6.9	136.0
	10/19/99	12640 Day 10 CT	50	7.4	9.2	36.0	50	6.9	12.9	120.0
	10/19/99	12641 Day 10 CT	50	9.2	11.4	44.0	50	12.9	19.1	124.0
	10/20/99	12664 Day 10 CT	50	42.2	44.2	40.0	50	15.0	22.5	150.0
	10/20/99	12665 Day 10 CT	50	44.2	46.0	36.0	50	22.5	29.5	140.0
	10/20/99	12666 Day 10 CT	50	46.0	47.9	38.0	50	29.5	36.9	148.0
	10/20/99	12668 Day 10 CT	50	0.2	1.8	32.0	50	36.9	42.4	110.0
	10/20/99	12671 Day 10 CT	50	1.8	3.9	42.0	50	0.4	7.9	150.0
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Client: Men Zie-Cura Project:	94033	BTR: Several	
Sample Description:	Day O	HA/CT	

				ALKA	LINITY	<del></del>		HARE	NESS		Ī	
			Sample	Titrant	Titrant	Analyst	Sample	Titrant	Titrant	Analyst	Data	
	Sample	Sample	Vol.	Init.	Final	Date/	Vol.	Init.	Final	Date/ Init.	enter	
	ID ID	Date		Vol.	Vol.	Init.	<i>E</i> > 1	Vol.	Vol.		Init.	$\overline{}$
	1201	10/9	50ml	37.8	398	1934	50ml	30.2	110	101345	11/23	KB
	121612	1019	52	398	41.8	10/13/5	-	31.4	145.U	<del>                                     </del>	$\vdash$	
	كسي	10/19	12/2	41.8	43.7	135		<u>0.8</u>	90	<del>                                     </del>	$\vdash$	_
	12614	10/19	50	0.4	2,5	14130		40	105	!	$\vdash$	
	12111	10/9	24	$\alpha \supset$	4.4	10113.8	-	1105	24.1	<del>-</del>	$\vdash$	
	17.038	10/9	<u> න</u>	44	<u> </u>	1235		24.1	132.2	1		_
	157632	1019	<u></u>	66	حكيظ	1038		322	<u> غېرن</u>			
	13164Ö	10/9		<u> Š 3</u>	100	101218		38.6	40.	<u> </u>		_
	12041	10/9	50_	10.0	<u>12-0</u>	13/13/15	*X 3	0.6	52	<u>.                                    </u>	1	<u></u>
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12546	10546	10/7	50	Ia.C	135	1013 x	50m	1 KO.4	23.1	id348	1 23 R	22
12547	16547	10/7	50	13.5	15.3	735	1	23.1	28.7	-		
12 548	105H8	WF	50	15.3	17.0	1013×		28.7	34.60	<u> </u>		
12 549	10549	:017	50	17-0	18.7	10/1345		34.6	40.6			
12550	W550	1017	50	18.7	20.4	10/38		140.6	405	1		
12551	12551	1017	50	204	222	10113/8		0.6	63	1		
12552	18552	1017	50	232	240	1413 8		6.3	127			
12589	10589	2101	50_	24.C	25.4	33 F		p.7	19.0	ă _		
12590	12590	10/8	50 50	20.4	2109	13734		19.0	255			
12541	1591	10/8	50	25.9	28.3	عزجزن		25.5	493			
12512	4592	1:1/×	50	28.3	299	1335		1.0	7,3	ii N		
1253	12593	10/8	50	299	31.3	13.326		7.3	13.2	3147		
1264	ide09	10/8	5D	3.3	33.0	10/345		13.2	20.0	!		
12.6 C	10610	15/8	50	330	34.4	14138		20.0	27.8			
12615	10015	10/8	50	34.4	359	141314	l	27,5	34.D			
	1210104	10/10	(カロ	359	372	1013 9	:	34,0	42.0	i		
	12145	מילינו	50	37.2	39.2	1413 18		0.8	79			
	121ddo	10/10	50	39.2	-41.5	10138		79	110.0			
	IZIAGE IZIAGE IZIAGE	מוטו	50 50 50 50	41.5	43.4	1913 P		110.0	16.0 235 30.2			
	12/07/	בונוכיו	50	43.4	444	10/13/5	¥	23.5	30.2	1 1		_
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Client: Menzie-Cura	Project:	BTR: Several
Sample Description:	Day 10 (+.	10/17

			ALKA	LINITY		·	HARD	NESS	<del></del>	
Sample ID	Sample Date	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol,	Analyst Date/ Init.	Sample Voi.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init,
12540	10/17	50ml	33.4	353	12/2/8	50M	8.1	15.8	12/2 83	
147	1		35.3	.37.7	1	1	8.1	23.2	1	
48			37.7	39.4			232	29.9		
49			39.4	41.			29.9	38.0		
50			41.1	42.9			38.0	458		
151		<b></b> -	42.9	44.7			0.1	18.1		
152			44.7	465		<u></u>	8./	15.7	-4-	
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Client: Menzy (wa	Project:	BTR: Sevent
Sample Description:	C.t. day 10	10/18
	+ H.a.	

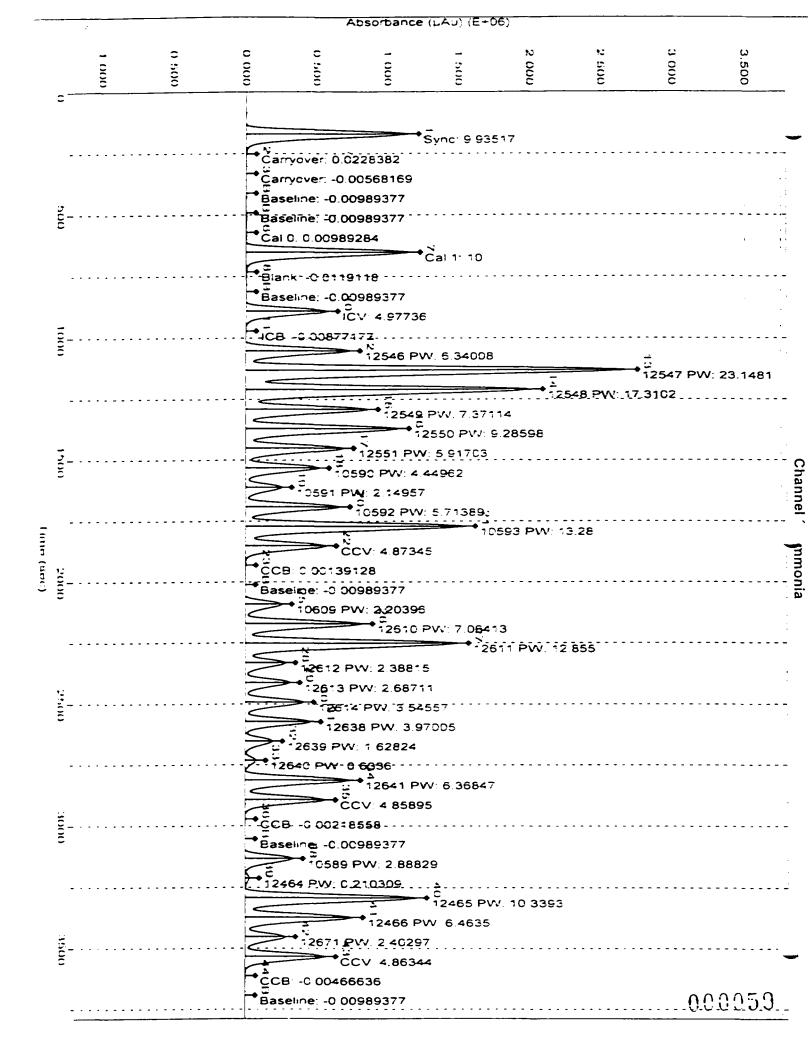
				ALKA	LINITY			HARD	NESS		
		_	Sample	Titrant	Titrant	Analyst	Sample	Titran:	Titrant	Analyst	Data
	Sample ID	Sample Date	Vol.	Init. Vol.	Final Vol.	Date/ Init.	Vol.	Init. Vol.	Final Vol.	Date/ Init.	entered Init.
Ċŧ-	12589	10/18	50my	15.9		12675	5im	19.60	28.4	3/18	mic.
<b>C</b> '	90	10118	<u> </u>	17.9	19.9	<u>رو دم ۱۰</u>	) (110)	284	309	1	
	91			19.9	21.9	† -		310-9	45.4		
	92			21.9	23.8			0.1	86		
	-93			23.8	257	:	:	8.6	17.8		
	12609			257	28.1	. !		17.8	25.4		
	-10°			28.1 30.0	30.0			25.4	33.8		
C+-	12/015		4	30.D	31.3			33.8	41.7	<u> </u>	
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H.a.	12415	1018	Simu	3.3	33.4	14248	52 4	0.2	8.1	12/1/18	
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Sample Description: Day 10 Ha + C. F

				ALKA	LINITY			HARD	NESS		
	Sample ID	Sample Date	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init.
H.a.	12/011	10/19	50ml	270	28.8	11/21/18	50ml	36.9	44,2	"/21 45	
{	121012			28.8	30.5		i	0.3	7.4	1	
	16/3			30.5	32.4			7.6	14.5		
	614	<i> </i>		32.4	34.1			145	21.2		
	422			34.1	35.6		<u> </u>	21. 2	27.8	-	
	U38 1039			35.10 37.5	37.5 39.2	<del>                                     </del>	<del>  </del>	27.8 34.6	34.6		
	1040			39.2	41.0			41.4	48.4	<del></del>	
	- 671			41.0	43.0	1		0.0	69	1	
				,,,,,				0.0	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
C.t.	12411	10/19	50ml	43.0	44.6	11/218	50ml	6.9	14.0	11/2iys	1/23 RB
i	1612			44.10	46.4			14.0	20.4		
	613			46.4	482			20.4	26.8		
	614			0.3	39	1	<del>                                     </del>	26.8	33.2		
	022 038			3.9	3.9			33.2	39.8		
	439			5.5	7.4		<del>  </del>	6.1	40.5		
!	40			7.4	92			(0.9	12.9		
+	- 641		1	9.2	11.4			12.9	191		4
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ALKALINITY HARDNESS  Sample Sample trant Titrant Analyst Sample Titrant Titrant  Sample Sample Vol. Init. Final Date: Vol. Init. Final  Vol. Vol. Init. Vol. Vol.  DICH 1020 50nd 32.1 340 345 50nd 24.1 318	
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121014 1020 50ml 32.1 34.0 24.1 31.8	Date/ entered Hnit. 198 Init.
	50m)
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10 100 31.3 35.4 39.8 46.5	
L 17 1 1 40.1 422 1 1 7.4 150	<u> </u>
	12/- 12
121004 1720 50ml 42.2 44.2 12/55 50ml 150 225 1	4 ys
1+7 100 -: 0 47.9 29.5 30.9 100 02.18 30.9 42.9	<del></del>
-7 - 1.8 39 - 1 1 19 79	1
	<del></del>
<u> </u>	

Results of Ammonia Analyses (Total, mg/L)  Chironomus tentans / Dead Creek / Project 99033									
Sample	Porewater	Day 0	Day 10 Chironomus						
ID		Overlying Water	tentans						
12546	6.3	1.1	1.1						
12547	23.1	4.5	2.6						
12548	17.3	3.5	4.1						
12549	7.4	1.6	1.0						
12550	9.3	2.8	1.6						
12551	5.9	1.7	1.9						
12552	-	<0.5	0.5						
12589	2.9	<0.5	1.3						
12590	4.4	0.5	0.9						
12591	2.1	<0.5	<0.5						
12592	5.7	0.9	0.5						
12593	13.3	2.1	<0.5						
12609	2.2	<0.5	1.4						
12610	7.1	0.9	0.7						
12611	12.9	4.3	0.8						
12612	2.4	0.7	<0.5						
12613	2.7	0.9	0.7						
12614	3.5	1.2	1.1						
12615	-	<0.5	0.6						
12622	-	<0.5	0.7						
12638	4.0	1.2	0.9						
12639	1.6	0.8	<0.5						
12640	0.6	0.6	<0.5						
12641	6.4	2.7	1.7						
12664	<0.5	<0.5	<0.5						
12665	10.3	3.4	1.3						
12666	6.5	2.2	0.9						
12668	<u>.</u>	<0.5	0.6						
12671	2.4	0.7	<0.5						



File name: C:\FLOW\_4\101299E.RST Date: October 12, 1999 Operator: LKS

ek	Cup	Name	Type	Dil	Wt	Height	Calc. (mg/L)
l	2	Sync	SYNC	- 1	1	1150681	9.935171
2	0	Carryover	CO	ī	ī	3787	0.022838
3	0	Carryover	CO	ī	ī	487	-0.005682
В	0	Baseline	RB	ī	1	0	-0.009894
В	0	Baseline	RB	ī	ī	0	-0.009894
6	1	Cal 0	C	ī	ī	2289	0.009893
7	2	Cal 1	Ċ	ī	ī	1158182	10.000000
8	0	Blank	Ū	ī	ī	-233	-0.011912
В	0	Baseline	RB	ī	ī	0	-0.009894
10	3	ICV	U	ī	ì	577044	4.977356
1 <u>1</u>	1	ICB	U	ī	ī	130	-0.008772
12	31	12546 PW	U	ī	ı	734716	6.340084
13	32	12547 PW	U	1	1	2679467	23.148100
14	33	12548 PW	U	1	1	2004003	17.310225
15	34	12549 PW	U	1	1	854013	7.371138
16	35	12550 PW	Ū	<u>1</u>	1	1075568	9.285980
17	36	12551 PW	Ū	1	<u>1</u>	685767	5.917027
18	37	10590 PW	U	1	1	515983	4.449624
19	38	10591 PW	U	1	ı	249859	2.149575
20	39	10592 PW	Ū	1	<u>1</u>	662263	5.713890
21	40	10593 PW	U	1	1	1537687	13.279972
22	3	CCV	U	1	1	565021	4.873451
23	1	CCB	Ü	1	<u>1</u>	1306	0.001391
	0	Baseline	RB	1	3	0	-0.009894
<b>W</b> 5	41	10609 PW	U	1	1	256151	2.203963
26	42	12610 PW	U	1	1	820805	7.084130
27	43	12611 PW	U	1	1	1488515	12.854989
28	44	12612 PW	U	1	1	277463	2.388149
29	45	12613 PW	U	1	ī	312054	2.687114
30	46	12614 PW	U	1	1	411381	3.545574
31	47	12638 PW	U	1	1	460495	3.970054
32	48	12639 PW	U	1	l	189538	1.628238
33	49	12640 PW	ט	1	1	74455	0.633600
34	50	12641 PW	U	1	1	738001	6.368472
35	3	CCA	Ū	ı	1	563344	4.858951
36	1	CCB	Ū	1 1	1	892	-0.002186
В	0	Baseline	RB		1	0	-0.009894
38	51	10589 PW	U	1	1	335331	2.888294
39	52	12464 PW	U	1	1	25478	0.210309
40	53	12465 PW	U	1	1	1197437	10.339272
41	54 55	12466 PW	U	1	1	748996	6.463504
42	55	12671 PW	U	1	ב	279177	2.402970
43	3	CCV	U	1	J	563863	4.863436
44 D	1	CCB	U	1	1	605	-0.004666
В	0	Baseline	RB	1	1	0	-0.009894

Peak	Cup	Flags
<u> </u>	2	
2	0	
3	0	TO
В	0	BL

ĒCB 0 0034922 Baseme<del>r 0 003</del>32654

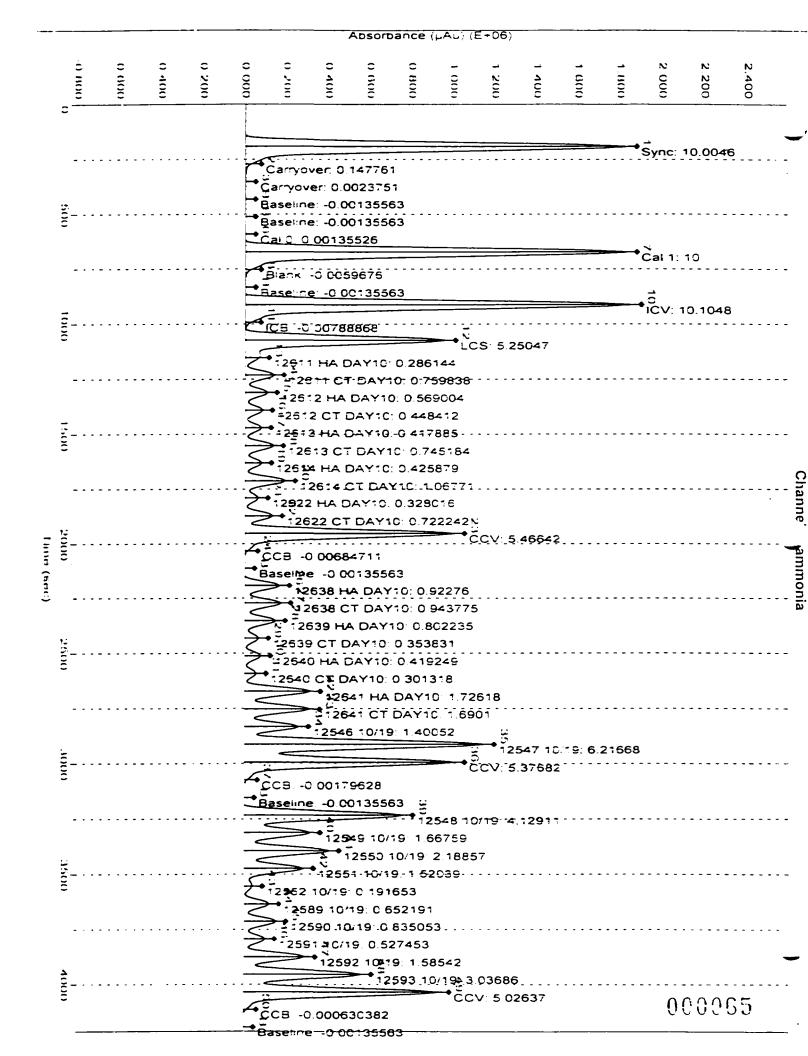
File name: C:\FLOW\_4\101299F.RST Date: October 12, 1999 Operator: NVW

	Cup	Name	Type Dil	Kt.		Height	Calc. (mg/L)
-	3	Sync	SYNC	1	1	554454	4.898925
2	0	Carryover	CO	1	l	2027	0.014281
3	0	Carryover	CO	1	l	72	-0.002705
0 H H 0	0	Baseline	RB		1	0	-0.003327
3	0	Baseline	RB	<u>1</u>	1	0	-0.003327
É	<u>1</u>	Cal 0	С	J	<u>1</u>	766	0.003326
7	2	Cal 1	C C U RB	<u> </u>	1	1151801	10.000001
3	0	Blank	Ũ	-	l	-713	-0.009521
8 B 10 21	0	Baseline		<u>.</u>	1	0	-0.003327
<u> </u>	3	ICV	Ü	<u> </u>	l	563210	4.888124
11	l	ICB	ם ס כ ס כ כ כ כ	<u> </u>	1	-185	-0.004933
-2	61	12031 DAY28	ij	ī	ī	3397	0.026174
13	62	12032 DAY28	ີວ	<u>~</u>		3053	0.023187
24	63	12033 DAY28	Ü	<u> </u>	<u>1</u> 1	3365	0.025895
15 16 17	64	12034 DAY28	J	<u> </u>	1	2666	0.019831
1.5	65	12035 DAY28	Ū	<u> 1</u>		2652	0.019706
<b>-</b> 7	66	10546 DAY0	Ū	<u> </u>	1	131553	1.139205
19 20 20	67	10547 DAY0	ប ប	<u> </u>	1	516340	4.481058
<u> </u>	68	10548 DAY0	IJ	<u> </u>	1	399699	3.468033
20	69	10549 DAY0	Ū	<u> 3</u>	1 1 1 1	187292	1.623291
2:	70	10550 DAY0	ij	1		320812	2.782907
22	3	CCV	บ	<u> </u>	ī	563248	4.888451
23	<u>1</u>	CCB	Ü	1	<u>.</u> 	192	-0.001662
	0	Baseline	RB	1	1	0	-0.003327
Ŵ	71	10551 DAY0	ប	1	1	191736	1.661889
25	72	10552 DAY0	Ü	1	<u> </u>	20094	0.171191
2.7	73	12664 DAY0	์ บ	1	1	-655	-0.009012
2.8	74	12665 DAY0	Ü	ī	l	390790	3.390665
29	75	12666 DAYO	ט	<u>1</u>	1	256086	2.220768
30	76	12668 DAYO	U	1	1	24824	0.212270
	77	12671 DAY0	Ū	1	1	82076	0.709502
32	78	10589 DAY0	<u> </u>	. 1	ı	41329	0.355618
33	79	10590 DAY0	Ŭ :	1	<u> 1</u>	58592	0.505543
34	60	10591 DAY0	<u>n</u>	1	1	38378	0.329983
35	3	CCA	ਹ 	1	1	562789	4.884464
3 €	7-1	CCB	บ	1	ī	775	0.003405
⊒ 3 €	0	Easeline 10592 DAY0	RB	<u> </u>	1	0	-0.003327
2.5	81 82		Ū -:		ī	109196	0.945034
6 to 10	62 83	10593 DAY0 10609 DAY0	บ เว	-	1	242593	2.103578
41	63 84	10609 DATO	<b>ប៊</b> . ប៊ូ	÷ ;	1	35412	0.304225
42	85	10610 DATO	U	÷ -	1	101344	0.876840
43	86	12611 DAYO	บ	÷	<u>1</u> 1	15104 498576	0.127849
44	8 <b>7</b>	12611 DATO	IJ	<u>.</u>			4.326778
45	88	12613 DAYO	บี	÷ ;	<u>1</u>	82423 98867	0.712516
46	89	12614 DAYO	บี	<del>-</del>	<u> </u>	141727	0.855326 1.227565
47	90	12614 DATO	บั	-	i	22778	0.194497
	3	CCV	บั	- -	i	559331	4.854431
48	ī	CCB	Ü	÷	1	188	4.854431 -0.001692
in and	0	Baseline	RB	d d d d d d d d d d d d d d d d d d d	÷	700	-0.001692
<u> </u>	91	12638 DAYO	หร ช	-	1	138983	1.203735
52	92	12639 DAYO	บี	÷	1	91032	0.787281
53	93	12640 DAYO	ប៊	i i	ì	73388	0.634042
54	94	12641 DAYO	บ	1	ì	306520	2.658779
- <del>-</del>	- •		=	-	-	\$ C C J Z O	
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							Absort	bance	: (µAu, )	(E+06)						
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		<del>.</del>			78-77	over. 0.	13501	===	==	===	<del>===</del>			Sync:	9.9234	ļ1
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<u>:</u>	·	, <b></b>			ICB -	D-001Z	4422									
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• • •				<	$\cong$	12546	1254	47 HA I		D: <b>2 493</b>						
<u>.</u>		<b></b>			$\leq$		→ : <sub>25</sub> 2548+	47 CT	DAY10 <b>¥</b> 70:-1.8 1 <b>254</b> 8 0	C. 2 607 .88296 -	72 					
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				<u> </u>	1255	50 NA 1			05201 10: 1.61	1053						
		. <b></b>			<u></u>	-0.0117				Ç <u>CV: 5</u>	.3 <u>644</u>		<b>.</b>	- <b></b>		
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		. <b></b>		<u>&lt;</u>	12	2551 N/			734703 Y10: 1.8						· <b></b>	
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				$\leq$		90 HA E	DAY10	0: 0.310								
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700 - · · ·				INTAMAM	126	2609 HA 1260 610 HA 1610 CT	A DAY 09 CT ( 3 DAY1 T DAY1 DAY10	710: 0.7 DAY10 10: 0.5 710: 0.6	716995 0:1 410 664305 68444 6924	C17	33					

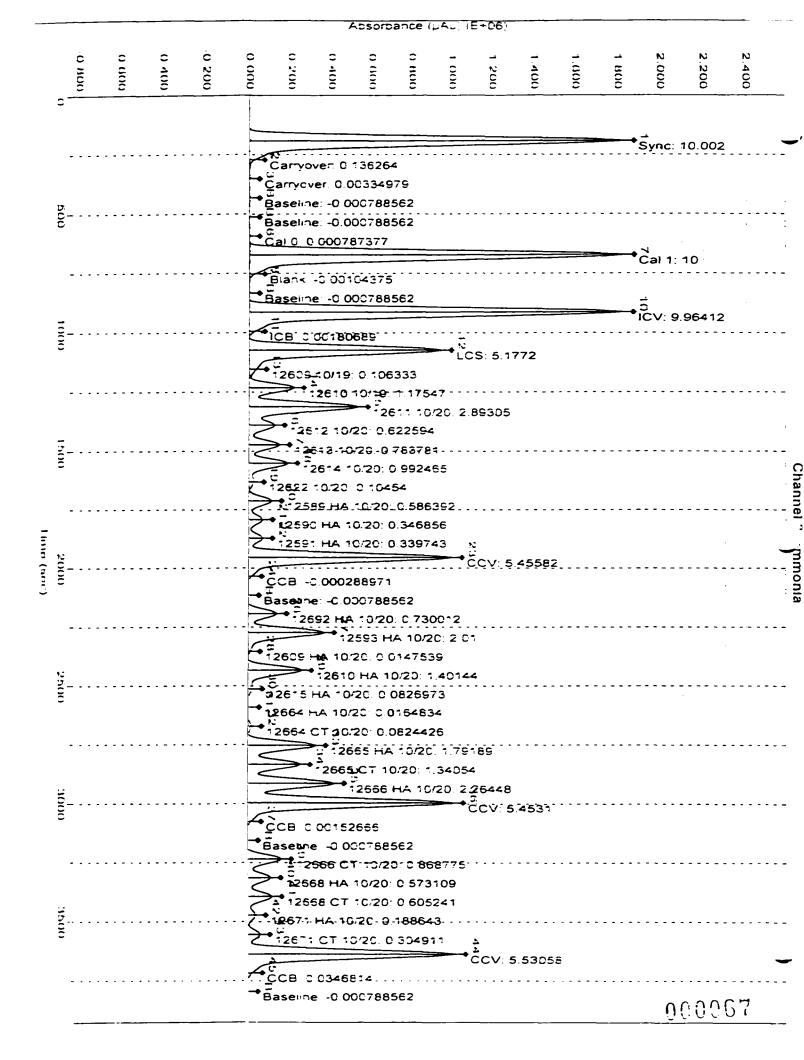
File name: F:\FLOW\_4\102799C.RST Date: October 28, 1999 Operator: LKS 27

opez		215					
P. k	Cup	Name	Type Dil	Wt		Height	Calc. (mg/L)
l	2	Sync	SYNC	1	1	1826754	9.923410
2	0	Carryover	CO	1	1	24722	0.135034
3	0	Carryover	CO	l	1	685	0.004470
В	0	Baseline	RB	1	ı	0	0.000748
В	. 0	Baseline	RB	1	1	0	0.000748
6	1	Cal O	С	1	l	-276	-0.000749
7	2	Cal 1	C	1	1	1840854	10.000001
8	0	Blank	Ū	1	1	-1182	-0.005674
В	0	Baseline	RB	1	1	0	0.000748
10	2	ICV	U	l	1	1853145	10.066763
11	1	ICB	U	1	1	-367	-0.001244
12	3	LCS	U	1	1	965717	5.246381
13	91	12546 HA DAY10	U	1	1	14025	0.076929
14	92	12546 CT DAY10	Ŭ 	1	1	196727	1.069342
15	93	12547 HA DAY10	U	1	1	458976	2.493840
16	94	12547 CT DAY10	U	1	1	479846	2.607204
17	95	12548 HA DAY10	U	1	1	346513	1.882956
18	96	12548 CT DAY10	U	1	1	762189	4.140845
19	97 60	12549 HA DAY10	U	1	1	103571	0.563331
20	98	12549 CT DAY10	U	1	1	178661	0.971210
21 22	99 100	12550 HA DAY10 12550 CT DAY10	U	1	1	74460	0.405201
22	3	12550 CT DAY10 CCV	U	1	1	296360	1.610535
-	1	CCB	U U	1 1	1	987444	5.364398
В	0	Baseline	RB	1	<u>1</u>	-2301	-0.011749
26	101	12551 HA DAY10	U	1	<u> </u>	0	0.000748
27	102	12551 RA DATIO	บ	ì	1 1	135120 343845	0.734703
28	103	12552 HA DAY10	Ū	ì	1	91487	1.868462 0.497690
29	104	12552 CT DAY10	Ū	1	1	101338	0.497690
30	105	12589 HA DAY10	บี	ì	ì	133761	0.727318
31	106	12589 CT DAY10	Ū	ì	ì	243394	1.322828
32	107	12590 HA DAY10	Ū	ī	ī	56959	0.310143
33	108	12590 CT DAY10	Ū	ĩ	ī	170229	0.925407
34	109	12591 HA DAY 10	U	i	ı	16286	0.089209
35	110	12591 CT DAY10	Ū	1	1	83796	0.455918
36	3	CCV	U	1	1	861614	4.680911
37	1	CCB	Ū	1		1846	0.010774
В	0	Baseline	RB	1	<u>1</u> 1	0	0.000748
39	111	12592 HA DAY10	U	ı	1	47120	0.256698
40	112	12592 CT DAY10	Ū	1	1	97926	0.532669
41	113	12593 HA DAY 10		l	1	14273	0.078279
42	114	12593 CT DAY10	U	l	1	81341	0.442583
43	115	12609 HA DAY10	U	1	1	131861	0.716995
44	116	12609 CT DAY10	U	1	1	259474	1.410171
45	117	12610 HA DAY10	U	1	1	103750	0.564305
46	118	12610 CT DAY10	U	1	1	125867	0.684440
47	119	12615 HA DAY10	U	1	1	41639	0.226924
48	120	12615 CT DAY10	U	1	1	112056	0.609421
	3	CCA	U	l	1	853959	4.639331
	ı	CCB	U	1	1	210	0.001889
В	0	Baseline	RB	1	1	0	0.000748



File name: F:\FLOW\_4\102799D.RST Date: October 26, 1999 Operator: LKS 27

Cup	_		210					
2		Cup	Name	Type Dil		Wt 	Height	Calc. (mg/L)
2	7	2	Sync	SYNC	7	·	1828142	. 10 004595
3 0 Carryover CO 1 1 682 0.002375 3 0 Baseline RB 1 1 0 0 -0.001356 6 1 Cal 0 C 1 1 495 0.00355 7 2 Cal 1 C 1 1 1827302 10.000000 3 0 Blank U 1 1 -843 -0.005968 10 0 2 ICV U 1 1 186458 10.104847 11 1 ICB U 1 1 1846458 10.104847 11 1 ICB U 1 1 1 1846458 10.104847 11 1 ICB U 1 1 1 182528 0.286144 14 32 12611 CT DAY10 U 1 1 1 52528 0.286144 14 32 12611 CT DAY10 U 1 1 1 139074 0.759838 15 33 12612 HA DAY10 U 1 1 1 104208 0.569004 16 34 12612 CT DAY10 U 1 1 1 162598 0.448412 17 35 12613 HA DAY10 U 1 1 1 163397 0.745184 19 37 12614 HA DAY10 U 1 1 1 163397 0.745184 19 37 12614 HA DAY10 U 1 1 1 163397 0.745184 19 37 12614 HA DAY10 U 1 1 1 195324 1.067707 21 39 12622 HA DAY10 U 1 1 1 195324 1.067707 21 39 12622 CT DAY10 U 1 1 1 195324 1.067707 21 39 12622 CT DAY10 U 1 1 1 195324 1.067707 21 39 12622 CT DAY10 U 1 1 1 104208 0.328016 22 40 12622 CT DAY10 U 1 1 1 166178 0.328016 23 3 CCV U 1 1 1 168841 0.922760 24 1 2638 HA DAY10 U 1 1 1 168841 0.922760 27 42 12638 CT DAY10 U 1 1 1 168841 0.922760 27 42 12638 CT DAY10 U 1 1 1 168841 0.922760 27 42 12638 CT DAY10 U 1 1 1 168841 0.9227760 27 42 12638 CT DAY10 U 1 1 1 168841 0.922760 27 42 12638 CT DAY10 U 1 1 1 168841 0.922760 27 42 12638 CT DAY10 U 1 1 1 168841 0.922760 27 42 12638 CT DAY10 U 1 1 1 168620 0.802235 28 44 12659 CT DAY10 U 1 1 1 168620 0.802235 29 44 12659 CT DAY10 U 1 1 1 168620 0.802235 20 48 12640 CT DAY10 U 1 1 1 166620 0.802235 20 44 12659 CT DAY10 U 1 1 1 168680 0.425679 21 1 CCB U 1 1 1 155300 0.30318 22 47 12644 HA DAY10 U 1 1 1 166620 0.802235 24 45 12640 CT DAY10 U 1 1 1 166620 0.802235 25 50 12557 10/19 U 1 1 1 136636 0.60535381 20 45 12640 CT DAY10 U 1 1 1 166620 0.80535381 20 45 12640 CT DAY10 U 1 1 1 166620 0.80535381 20 45 12640 CT DAY10 U 1 1 1 166620 0.80535381 20 45 12640 CT DAY10 U 1 1 1 166620 0.80535381 20 45 12640 CT DAY10 U 1 1 1 166620 0.80535381 20 45 12650 10/19 U 1 1 1 166666 0.805553 20 12550 10/19 U 1 1 1 126616 0.527453 21 1 CCB U 1 1 1 166666 0.805553 22 50 12550 10/19 U 1 1 1 166666 0.805553 23 12550 10/19 U 1 1 1 166666 0.80555								
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43       55       12552 10/19       U       1       1       35264       0.191653         44       56       12589 10/19       U       1       1 129406       0.652191         45       57       12590 10/19       U       1       1 52816       0.835053         46       58       12591 10/19       U       1       1 96616       0.527453         47       59       12592 10/19       U       1       1 289912       1.585416         48       60       12593 10/19       U       1       1 555099       3.036863         49       3       CCV       U       1       1 918593       5.026368         1       CCB       U       1       1 133       -0.000630					1	1		2.188566
47       59       12592       10/19       U       1       1       289912       1.585416         48       60       12593       10/19       U       1       1       555099       3.036863         49       3       CCV       U       1       1       918593       5.026368         1       1       CCB       U       1       1       133       -0.000630						ב		1.520385
47       59       12592       10/19       U       1       1       289912       1.585416         48       60       12593       10/19       U       1       1       555099       3.036863         49       3       CCV       U       1       1       918593       5.026368         1       1       CCB       U       1       1       133       -0.000630				Ū		1		0.191653
47       59       12592       10/19       U       1       1       289912       1.585416         48       60       12593       10/19       U       1       1       555099       3.036863         49       3       CCV       U       1       1       918593       5.026368         1       1       CCB       U       1       1       133       -0.000630						1		0.652191
47       59       12592       10/19       U       1       1       289912       1.585416         48       60       12593       10/19       U       1       1       555099       3.036863         49       3       CCV       U       1       1       918593       5.026368         1       1       CCB       U       1       1       133       -0.000630						1	152816	0.835053
47       59       12592       10/19       U       1       1       289912       1.585416         48       60       12593       10/19       U       1       1       555099       3.036863         49       3       CCV       U       1       1       918593       5.026368         1       1       CCB       U       1       1       133       -0.000630						ı		0.527453
49 3 CCV U 1 1 918593 5.026368 1 CCB U 1 1 133 -0.000630						1		1.585416
1 CCB U 1 1 133 -0.000630							555099	3.036863
1 CCB U 1 1 133 -0.000630	49					1	918593	5.026368
		1					133	-0.000630
	3	0	Baseline	RB	1		0	-0.001356



File name: E:\FLOW\_4\102799E.RST Date: October 28, 1999

Operator: LKS

<b>↓</b> k	Cup	Name	Type Dil	Wt		Height	Calc. (mg/L)
1	2	Sync	SYNC	1	1	1827617	10.001991
2	0	Carryover	CO	1	1	25041	0.136264
3	0	Carryover	CO	1	1	756	0.003350
В	0	Baseline	RB	1	1	0	0.000789
В	0	Baseline	RB	1	1	0	-0.000789
6	1	Cal 0	С	1	1	288	0.000787
7	2	Cal 1	С	1	1	1827253	10.000001
8	Ö	Blank	Ū	1	ı	-47	-0.001044
В	0	Baseline	RB	1	1	0	-0.000789
10	2	ICV	Ŭ	1	1	1820698	9.964125
11	1	ICB	U	<u>1</u>	1	474	0.001807
12	3	LCS	์ บี	ī	1	946075	5.177200
13	61	12609 10/19	Ū	1	ī	19572	0.106333
14	62	12610 10/19	Ū	1	ī	214916	1.175473
15	63	12611 10/20	บี	ī	<u> </u>	528736	2.893049
16	64	12612 10/20	Ū	1	<u>-</u>	113899	0.622594
17	65	12613 10/20	Ū	1	1	143349	0.783781
18	66	12614 10/20	Ū	1	ī	181478	0.992465
19	67	12622 10/20	Ū	ī	ī	19245	0.104540
20	68	12589 HA 10/20	Ū	ī	ì	107284	0.586392
21	69	12590 HA 10/20	Ŭ	1	1	63518	0.346856
22	70	12591 HA 10/20	Ŭ	ī	ì	62219	0.339743
53	3	CCV	Ū	ĺ	1	996983	5.455823
يد. استان	1	CCB	Ū	1	1	91	-0.000289
	Ō	Baseline	RB	ī	1	0	-0.000789
26	7 <u>1</u>	12692 HA 10/20	Ŭ	1	1	133525	0.730012
27	72	12593 HA 10/20	Ŭ	1	1	367392	2.009997
28	73	12609 HA 10/20	Ŭ	ī	1	2840	0.014754
29	74	12610 HA 10/20	Ū	1	ī	256203	1.401440
30	75	12615 HA 10/20	บั	ī	ì	15254	0.082697
31	76	12664 HA 10/20	Ū	ī	ī	3156	0.016483
32	77	12664 CT 10/20	Ū	1	ī	15207	0.082443
33	78	12665 HA 10/20	Ŭ	1	1	327542	1.791890
34	79	12665 CT 10/20	Ŭ	ī	ī	245075	1.340539
35	80	12666 HA 10/20	Ū	1	1	413889	2.264477
36	3	CCV CCV	Ŭ	ī	1	996484	5.453096
37	1	CCB	Ŭ	ī	ī	423	0.001527
В	0	Baseline	RB	ĺ	1	0	-0.000789
39	81	12666 CT 10/20	U	ĺ	1	158879	0.868775
40	82	12668 HA 10/20	Ŭ	ĺ	1	104857	0.573109
41	83	12668 CT 10/20	Ū	ĺ	1	110728	0.605241
42	84	12671 HA 10/20	Ŭ	· 1	1	34611	0.188643
43	85	12671 HA 10/20	Ū	1	1	55855	0.304911
43 44	3	CCV CT 10/20	Ŭ	1	1	1010641	5.530580
45	3 1	CCB	Ŭ	1	1	6481	0.034681
45 B	0	Baseline	RB	1	1	0401	-0.000789
Ð	U	Dasettije	ΛD	_	7	U	-0.000769

ak	Cup	Flags
1	2	
2	0	
3	0	

ABS	NVW JWW
# Surie ID	40.5 40.5
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5. 5°,3 °C	· · · · · · · · · · · · · · · · · · ·
6. 10609 3	<u> </u>
7. 106.D &	
5 106.5 3	
9 2611 2	
10. 612 3	
11, 613 C	·
17 6(Y 2	
13 12672 3	
17635 C	: '
15 17639	
12640 3	
17 1764 3	· · · · · · · · · · · · · · · · · · ·
16 12546 M	
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ABS	NVW	JWW
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2 ex3 65 PW		
3 17671 PW 4 10546 M	·	
5 10 547 0	· · · · · · · · · · · · · · · · · · ·	)
6 10546 D		/
> 10549 P		
6 550 Ø		
9 10 551 0		
0 1552		-
11 72664 7		
12 665 0 13 666 V		
14 668 0		
15 671 9	V	
	WW	10/12/99.
	10/12/99	,

	NVW	Jun	
	< 0.5 pm5	20-5 p	gm 5
1. 17549 Fr.	~		
Z 550 Pr			
3. 12 551 PM		<del> </del>	
16569 î.			
5, 590 î	<u>:/</u>		
6 5918:	· •		
= 592 FV	•		
593 F	и ————————————————————————————————————		
9, 10609 8:			
D. 12610 f.			
1. 611 F.	•		
12. 612 ÎV	,		
5. <u>613 î.</u>			
Y. 614 F.			- ·————————————————————————————————————
5. 12638 2:	· · · · · · · · · · · · · · · · · · ·		
.c. 639 F.			
7. 640 fr.			
5. 64[E:			
76665	1.0	<u>.</u>	
70. 176667	· N		
	100 mm	13/1/99	
	. •		
5.0 pm	K MS		
, •			

Client: Menzie-Cura & Assoc. Project: 99033	BTR: 3615
• H. azteca acute test: 10/6/99 10/18/99; ALL SA	omogenized sediment): MPLES ゴム
• C. tentans acute test. 10/6/99	
• H. azteca chronic test: 10/18/99; ALL SAMPLES JO	5 for LS
• C. tentans chronic test: 18548, 12550, 12551; 16	118/99 JG for LS

| 10/28/99 - Lozden sediments for aux males (12548, 12550, 12537, 12532, 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12593, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12592, 12609) | 12609, 12609) | 12592, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609) | 12609, 12609, 12609) | 12609, 12609, 12609) | 12609, 126

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
12546	6.9			Viscous mud, NO Overlying water
12547	7.0			Liquid, fine mud, Many freshwater gastropoids, removed visible gastropoids ide
12548	7.0			Liquid mud, gastropads present, removed Those visible 1016 Tm
12549	7.0			Soft mud, pine needles some overlying water
12550	7.0			soft mud with overlying water pine needles
12551	7.0			Soft mud with overlying water
12552	mic16199		<u> </u>	EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3).
LCS	), (0,			Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by: 1 Date: 10 6 99

Reviewer: Date: 1/0/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

 $0 \ 0 \ 0 \ 0 \ 0 \ 0$ 

TM

Client: Menzie-	Cura & Ass	soc. Proj	ect: 9903	BTR: 3622 / 3629
				100 mL homogenized sediment):
H. azteca acu	ute test: 1	0/7/99 <sup>¥</sup> 16/	18/99 JG	- TM (Hystells revest)
• C. tentans ac	cute test:	10/7/99		
H. azteca chi	ronic test:			× 2.01. 12597
• C. tentans ch	ronic test	10/18/9	4: 185	92,12593,12609 TM Signed to remove
		, ,	,	1 TO I TELLE CICION INCL
	<del></del>		<del>-</del>	(for C.t. only
Sample	porew	porew	porew	
Number	рН	H2S	Amm	Sediment Visual Characterization
12589	7.1		لل	chrown muddy sediment with sticks an
12590	6,9		طا	brown muddy sediment with sticks and brown chestive mud with veg mater
12591	69			brown mud with veg material
<b>★</b> 12592	7.1			cik, busin mud with little veg, mater
12593	7,0		·	black watery much w/petrolium-like oder.
12609	7.1			thick ik brown oshesive mud with y
12610	7.2			ak brown very thick ashesive mud whome veg.
		; ;		w/some veg.
				material
	;	, ,		
		!		
			<u></u>	
12615		!	1	EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3).
LCS		! !	,	Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by: Date: 10 7 4 9

Reviewer Date 12/10/99
Laboratory Advetec Biological Sciences, South Burlington, Vermont

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Client: Menzie-Cura & Assoc.	Project: 99033	BTR:	3629 / 3633

H. azteca acute test: 10/8/99C. tentans acute test: 10/8/99

H. azteca chronic test:C. tentans chronic test:

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
12611	6.8			black mud w/leaf litter
12612	7.7			Fine Brown mud
12613	7.7			Soft Brown mud
12614	7.5			SOFT Brown mud
12638	7.6			Soft Brown mud
12639	7.3			sticks + leaves on top + through out cohesive mud, dark
12640	7.2			Sticks + leaf litter Dark thick mud
12641	72			SOFT Brown mud
12622				EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3).
LCS		_ <u></u>		Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia , samples.

sam Entered by: <u>116</u> Date: 10/8/99

Reviewer: \_\_\_\_\_ Date: \_\_\_(\(\mu/\left(1)\left(49\) Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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-Cura & Ass	oc. Proj	ject: 99033	BTR: 3641	
cute test: 10 ncute test: 1 nronic test:	/9/99	hambers (100 ml	. homogenized sediment):	
	Dorew	norew		
	distributed ute test: 10 cute test: 1	distributed to test cute test: 10/9/99 cute test: 10/9/99 cute test: 10/9/99 pronic test: hronic test:	cute test: 10/9/99 cute test: 10/9/99 cronic test: hronic test:	distributed to test chambers (100 mL homogenized sediment):  ute test: 10/9/99  cute test: 10/9/99  pronic test:  hronic test:

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
12664	7.8			fine cohesive and
12665	7.3			fine soft mud
	,			
12666	7.5			fine. Sticky/Cohesive mud
-12667-56 12671	7.4			fine, brown mud - chimomide present
				,
		:	<del>-</del>	: 
	,			
12668 LCS				EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by:  $\frac{1 - \sqrt{3}}{\sqrt{9}} = \frac{1 - \sqrt{3}}{\sqrt{9}}$ 

Reviewer Date 11/5/94
Laboratory Aquatec Biological Sciences, South Burlington, Vermont

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# Preparation of Formulated Control Sediment for Freshwater Sediment Toxicity Tests

Procedure based on EPA/600/R-94/024

Batch No. 10/4 Preparation Date: 10/4/99 Prepared by: 116.

Ingredient	Amount (g)	Percent composition
Fine sand	1848	
Medium sand	924	77
Kaolinite clay	612	17
Blended and 0.3 mm sieved Canadian sphagnum peat	180	5
CaCO3	36	1
Total	3600	100

Store well-mixed and dry in a sealed Rubbermaid box. Label by batch number. Store copy of this documentation in project file. Store original in Sed/Water preparation notebook.

Hydrate to a cohesive sediment consistency before use.

-Week of October 3, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)		/		V		V	
Noon delivery cycle							
• splitter boxes filling?		. /					
• synnges filling?						· ·	
• needles flowing?					! V	100	
• beaker screens clear, flowing?		_/_				1 1/2	
oranage to waste ox?		<u> </u>	1		V	<u> </u>	
• empty waste buckets?			<u> </u>		.V		
Test monitoring			·				
• test temperature ox?		1/	, /	V		1	
• D.O. 0K?	<b>V</b>						
checik for floating organisms	<b>V</b>	$\checkmark$	$\sqrt{/}$	V .			$\mathcal{J}$
• feeding completed?	/	<b>V</b>				1	V
Additional activities					·		<del></del>
Prior to midnight fill reservoirs (11)				V	Y	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Check sediment water supply					<b>/</b>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Corrective Action / Comments		· · · · · · · · · · · · · · · · · · ·	:	[ 			
				1	İ		į į
Initials/Date	16/3	35,0/4	-(G- 1-/5	ر م د د	55.0/7	M. Y	76 . of
Initials/Date  Procedure: All operating systemests are in progress. Corrective action on this form. If project-spocumentation form) and include	ns listed at e action m pecific doc	pove must ust be take umentation	be checke en whenev n is require	er appropr	ly basis whiate. Docu	nen sediment com	ective
Procedure: All operating systemests are in progress. Correctivation on this form. If project-species	ns listed at e action m pecific doc	pove must ust be take umentation	be checke en whenev n is require	er appropr	ly basis whiate. Docu	nen sediment com	ective
Procedure: All operating systemests are in progress. Correctivaction on this form. If project-spocumentation form) and include	ns listed at e action m pecific doc	pove must ust be take umentation	be checke en whenev n is require	er appropr	ly basis whiate. Docu	nen sediment com	ective

Reviewer Date 12/13/9 9
Laboratory: Aquatec Biological Sciences: South Surfington, Vermont

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### Week of October 10, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	<b>V</b>				V	/	V
Noon delivery cycle			,		,		
splitter boxes filling?	V.			•/	V,	/	
• syringes filling?			V		V	/	/
• needles flowing?		V	V	7,	V	/	/
beaker screens clear, flowing?				V,	V	/	<b>V</b>
drainage to waste ok?	1/1	V	V	V	V /	/	
empty waste buckets?	///			<b>V</b>	$\checkmark$		
Test monitoring		<del></del>				<del></del>	<del></del>
test temperature ok?				V/	V		V
• D.O. ok?			<u> </u>		137		/
· · · · · · · · · · · · · · · · · · ·	¥1) (		V	V	V	//	\\/_\c_
• feeding completed?	<u> </u>		V	V	V		
Additional activities				,	,	,	
Prior to midnight fill reservoirs (1L)		V/	$\checkmark$	$\checkmark$	///	V,	V
Check sediment water supply	V	1/		·/	V	$\checkmark$	V
				<u>-</u>			
Corrective Action / Comments							
	40						
Initials/Date	m 10/10	10/11	3/20	m 10/13	m :014	10/15	7G 10/16
		1	7,			<del></del>	

<u>Procedure</u>: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

	<u> </u>	
Comments:	ne ar\y	
K1) 10	2591, all reps had floaters 10110 Tm squirted Them	l
)	down most seemed to be living	
(F) 13	591 E.F.H had fleorers ich 1997 The	

(x3) 12666 Ha and (+. got an extra manual renewal 10/14 Jun pm

Reviewer Date 12/13/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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### Week of October 17, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	V	/			V		<b>/</b>
Noon delivery cycle				,			
splitter boxes filling?		1		V.			
* synnges filling?	/	- /				V	
* needles flowing?				V		<b>√</b>	
beaver screens clear, flowing?	_/	` /		V	V		
cramage to waste ok?		//		//			
· emoty waste buckers Turk	_//	· / /				V V	/ 1/
Test monitoring DAILY		·	<u>.</u>				
test temperature oic?	<u>/</u>			/			
• 10 ok?	1/	<u>                                     </u>				V	
check for floating organisms		1/2	<u> </u>			V/	
feeding completed?		<u> </u>	1/				
Additional activities				/ ,			
Poor to midnight fill reservoirs (1L)				<b>/</b> .	V,	V/	
Check sediment water supply	_/						1
Corrective Action / Comments			4			•	
Initials/Date	mile	77 70	767	10/30	10/21	10/53.	(ch2
miliais/Date	Ui: I	114. 24	1 10117	1 111/	1-	/9/e	14/03

<u>Procedure</u>: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

Comments:	C. 4072	CÉCENIC	TCST 5	er ups	nere	La	on D	4-1	(den	
proc	To 0/g2nis	रत्ने र	m) (	10/,	= /45					
L					_	É si	ه یی بر ه	wn	for	H

Experie war for H.2. change = Lane / Recon MX.

Experience for C.T. chronis
= Recon Warr.

seddettw.doc 10/19

Reviewer Date 12/13/95
Laboratory Aquatec Biological Sciences, South Burlington, Vermont

### Week of October 24, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
ACTIVITY / DAY  Prior to noon fill reservoirs (1L)  Noon delivery cycle  spitter boxes filling?			/				
	\/		V			V	<b>/</b>
N							
				1		· · · · · ·	, ,
• splitter boxes filling?		V	V		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	I V	
• syringes filling?	V	·/	V		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	V	V
• needles flowing?	//			V	V		
beaker screens clear, flowing?	V	//		1/	L V		
drainage to waste ok?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	r i	1	//		/ \	/ /
empty waste buckets?			Y	$\vee$	VV	VV	
Test monitoring					•		
• test temperature ok?			V	V	V	/	V
• D.O. ok?	-,	<b>V</b>		/_	/	VI	
check for floating organisms		V,		V	1		
• feeding completed?		V				V	./
Additional activities							
Prior to midnight fill reservoirs (1L)		V,	<b>\</b>	V	1	V	
Check sediment water supply	<b>V</b>	<b>/</b>		·/	<u> </u>		
Corrective Action / Comments							
				16		1	
Initials/Date	10/24	TM, Olas	Morce	10/33	10/38	10/39	10/30/16
Procedure: All operating system tests are in progress. Corrective action on this form. If project-sp Documentation form) and includ Comments:	ns listed ab e action mu ecific docu	oove must ust be take umentation	be checke n wheneven is require	er appropri	iate. Docu	ment corre	ective

Reviewer Date 12/13/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

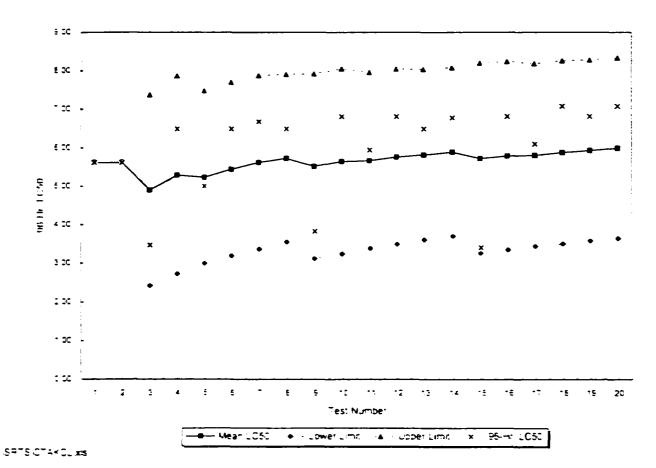
Week of October 31, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	ากบาร.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	V			$\checkmark$	V		
Noon delivery cycle							
• splitter boxes filling?	<b>✓</b>	<b>/</b>	<b>V</b>		V		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
* synnges fitting?	/	/					
• needles flowing?	V		/		· /		
<ul> <li>beaker screens clear, flowing?</li> </ul>	V	V	\ \/ .			<u>/</u>	
oramage to waste ok?	4	1	. Y ,	1		VI	1
empty waste buckets?	VV	VV		VV	VI	VV	VV
Test monitoring						· ·	
• test temperature ok?	V	1					
• D.C. ok?		. V	<u> </u>				-
check for floating organisms	V			/ \	V		
• feeding completed?	V	: V		·/			V
Additional activities							
Prior to midnight fill reservoirs (1L)		• 🗸		V	11,	1//	
Check sediment water supply		V		<b></b>			
Corrective Action / Comments							
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Procedure: All operating system tests are in progress. Corrective on this form. If project-specific d Documentation form) and include	action mi ocumenta	ust be take ition is requ	n wheneve lired, write	r appropri	ate. Docui	ment corre	
Comments: 11/5/99/mianis	J rene	wial mi	عمون ترو	كمصيعم	citiat	र्ध क्र	09:30
" Noak	أرجدون	uial mi	led at 10	1:00 11/E	<b>:</b> G	11/6	14. JJG

APPENDIX: D

# Reference Toxicant Control Chart Chironomus tentans in Potassium chloride (g/L)

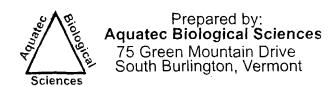
		Organism					
Test	Test	Age	96-Hr.	Mean	Lower	Upper	Organism
Number	Date	(Days)	LC50	LC50	Limit	Limit	Source
•	13/28/97	<b>•</b> c	5 612	5.61			Aquatec Biologica! Science
2	16/31/97	ç	5 612	5 61	5.51	5 €1	Aquatec Biological Science
3	1/1/02/97	ç	3 466	4 90	2 42	7.37	Aquatec Biological Science
٤	11/09/97	:0	6 484	5.29	2.72	7 <b>E</b> 7	Aduated Biological Science
£	11/10/97	ē	5 000	5.23	2 99	7.48	Aduated Biological Science
£	C8:23/98	• •	6 454	5 44	3 <b>-</b> 8	7.69	Aduated Bibliogical Science
-	09:15 <i>1</i> 98	ê	€ €74	5 62	3 3€	7 <b>£</b> 7	Aduated Biological Science
Ē	10/23/98	•:	5 454	5 T3	3 55	7.90	Aduates Biological Science
ş	11/10/98	9	3 827	5 52	3.12	7 <b>9</b> 1	Aduated Biological Science
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. 2	06/26/99	g and ""	6 804	£	3 4 9	€ 24	Aduated Biological Science
· 3	07 15/9 <del>9</del>	<i>*</i> 3	€ 484	5 E2	3 €*	E 54	Env. Consulting & Testing
~ 4	ST 15 799	•:	£	£ 89	3 70	E DE	Aduates Biological Science
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18	10°07'99	• •	7.57	5 5 5	3 50	E.2€	Aduated Biological Science
<i>•</i> €	10/11/99	10	6 804	5 93	3 58	E.28	Aduated Siblogical Science
20	10/27/99	٤	- :	5 98	3.54	8.33	Adusted Biological Science

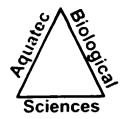


### Chironomus tentans Chronic Survival, Growth, Emergence and Reproduction Toxicity Tests Conducted on Sediment Samples from the Solutia Site, Sauget, Illinois

Reference BTRs 3615, 3622, 3629, 3633, 3641, 3643

Prepared for:
Menzie-Cura & Associates
1 Courthouse Lane, Suite 2
Chelmsford, MA 01824





# **Aquatec Biological Sciences**









BTRs 3615, 3622, 3629, 3633, 3641, 3643

PROJECT:

99033

I have reviewed this data package, which was completed under my supervision. This data package is complete, and to the best of my ability, accurately reflects the conditions and the results of the reported tests.

John W Williams

Toxicity Laboratory Manager

12/22/99

Date

I have reviewed and discussed this data package with the responsible laboratory manager. Based on this review, the data package was, to the best of my knowledge and belief, conducted in accordance with established company quality assurance procedures.

Philip O. Downey, Ph.D.

Director

12/23/99

Date

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APPENDIX C:	LABORATORY DOCUMENTATION AND DATA ANALYSES FOR
	Chironomus tentans TOXICITY TESTS

APPENDIX D: RESULTS OF STANDARD REFERENCE TOXICANT TESTS

### **EXECUTIVE SUMMARY**

100.5CT Midge. Chironomus tentans Chronic Survival, Growth,
Emergence, and Reproduction
Conducted October 19 - December 14, 1999
for Menzie-Cura & Associates
Solutia Site, Sauget, Illinois

Laboratory Sample ID	Client Sample ID	Day 20 Mean Survival (%)	Day 20 Mean Ash Weight (mg)	Emergence Proportion (%)	Mean Eggs Hatched/ Female	Mean Days Survived, Female	Mean Days Survived, Male
12546	BTOX-C-1	Acute	Toxicity				
12547	BTOX-C-2	Acute	Toxicity				
12548	BTOX-C-3	63	3.186	56	526	2.4	3.7
12549	BTOX-D-1	Acute	Toxicity				
12550	BTOX-D-2	31	0.937*	2*	0*	0.8*	0*
12551	BTOX-D-3	42*		10*	298	0.6*	1.1*
12552	Laboratory Control	81	2.679	50	130	2.8	4.5
12589	BTOX-B-1	Acute	Toxicity				
12590	BTOX-B-1 (DUPE)	Acute	Toxicity				
12591	BTOX-B-2	Acute	Toxicity				
12592	BTOX-B-3	52	2 244	52	302	2.5	3.1
12593	BTOX-M	40	2.216	54	430	3.6	4.1
12609	E-1 Dead Creek	54	2 501	42	576	3.5	2.4
12610	E-2 Dead Creek	Acute	Toxicity			***	
12611	E-3 Dead Creek	0 <b>*</b>		1*	0-	0.6*	0*
12612	BP-1 Borrow Pit	0*		5*	0*	0*	0.7*
12613	BP-1 Borrow Pit (DUPE)	0*		8*	127*	0.3*	0.8*
12614	BP-3 Borrow Prt	6 <b>*</b>		14*	106*	0.8*	1.2*
12622	Laboratory Control	46	2.959	45	554	3.1	4.9
12638	BP-2 Borrow Pit	Acute	Toxicity				
12639	F-1 Dead Creek Section F	Acute	Toxicity	••			
12640	F-2 Dead Creek Section F	Acute	Toxicity				
12641	F-3 Dead Creek Section F	Acute	Toxicity				
12664	Prairie DuPont Creek	Acute	Toxicity				
12665	Prairie DuPont Creek 2	69	3.074	13*	249	1.1*	1.4*
12666	Reference Creek	Acute	Toxicity				
12668	Laboratory Control	65	2.923	69	354	3.6	4.3
12671	Ref 2-2 Ref. Borrow Pit	Acute	Toxicity				<b></b>

The response data were statistically significantly different from the corresponding laboratory control sediment (p < 0.05)

<sup>--</sup> When a statistically significant reduction in survival was detected mean ash-free dry weight data were only reported in Appendix A.

### INTRODUCTION:

Samples were received for toxicity testing at Aquatec Biological Sciences of 75 Green Mountain Drive, South Burlington, Vermont. The results of the following tests are reported:

Client: Facility/Location:

Menzie-Cura & Associates Dead Creek / Sauget, Illinois October 4 - October 9, 1999

Initial Sampling Date: Testing Dates:

October 19 - December 14, 1999

Tests Conducted:

Midge, Chironomus tentans, Chronic Survival,

Growth, Emergence, and Reproduction

### **METHODS:**

### **Toxicity Tests**

The procedures followed in conducting these toxicity tests were based on <u>draft</u> methods described by the USEPA (EPA 600/R-98/XXX [new number pending]). Test conditions for *Chironomus tentans* are listed in Table 1. Testing was completed in three separate groupings based upon chronological sequencing from the time of sediment collection. The objective for the test groupings was to complete the 10-day acute tests prior to expiration of a project-specific 14-day sediment storage time so that subsequent chronic toxicity tests could be started within a 14-day time frame. The acute toxicity results were reported separately (Aquatec Biological Sciences, December 1999).

Sediments were loaded into beakers for chronic testing within one day after completion of the acute toxicity tests, therefore, the objective of starting all tests within 14-days from the time of collection was accomplished for all samples. Chronic toxicity testing for the first testing group was initiated on October 19, 1999. The second testing group was initiated on October 20, 1999. The third testing group was initiated on October 21, 1999. A laboratory control (artificial sediment) was included with each testing group. Midge larvae less than four hours old were obtained from Aquatec Biological Sciences in-house cultures. Chronic toxicity tests were ended (on an individual sample basis) following seven days with no observed emergence. Overlying water was renewed either automatically or manually. For those samples/replicates renewed automatically, the renewal cycle was programmed for midnight and noon of each day. For

samples/replicates renewed manually, the renewal cycle was performed at approximately 7:00 a.m. and 7:00 p.m. daily. Documentation of renewals and renewal system checks is located in Appendix C

### Sediment Preparation

The samples were stored refrigerated and in the dark whenever they were not being used in preparation for testing. Sediments distributed in test beakers were examined for the presence of indigenous organisms which were removed when observed. Also, large pieces of vegetative material (e.g., leaf litter, sticks, grass) were removed if observed. Qualitative observations regarding the sediment type and indigenous organisms removed were recorded. The laboratory control sediment (artificial sediment) was prepared following formulations specified in the USEPA protocols and then hydrated prior to distribution to test chambers. Sediments were then distributed to individual replicate test chambers, overlying water was added, and the overlying water renewal system was activated. The unused portion of each sample (in the original sample container) was returned to refrigerated storage.

During acute toxicity testing indigenous chironomid larvae found in Sample 12592 (BTOX-B-3) confounded the acute toxicity assessment. Prior to loading this sediment into beakers for the chronic toxicity test the sediment was sieved through a 0.3 micron Nitex mesh screen to remove indigenous chironomids.

### Statistical Analyses

Statistical endpoints included survival and growth (as measured by mean ash-free dry weight) of midge larvae, evaluated on Day 20. At the end of the test, proportion emergence, reproduction (mean number of eggs per female), and mean number of days male and female flies survived (after emergence) were evaluated.

Statistical comparisons were performed against the concurrent laboratory control. In some cases, where the mean laboratory control response was numerically less than or equal to the test sediment the test samples were judged to be non-significant. If complete mortality was observed in any sample, the response was considered to be significant. Statistical significance for any sample was based upon the most sensitive endpoint observed.

An F-Test was performed to test for equality of variances between each sample and the corresponding control for each endpoint examined. Proportion surviving data were transformed (Arcsin square-root) before analysis. If variances were not significantly different, paired T-Tests with equal variances were used to determine whether there was a significant reduction in the mean response relative to the corresponding control. If the variance between a sample and control comparison was significantly different, paired T-Tests adjusted for unequal variances were used to identify significant reductions in the response.

### **PROTOCOL DEVIATIONS:**

At the Day 20 assessments of survival and growth, some pupating larvae and post-emergent body casts were found in some test replicates. Day 20 survival totals were established by combining larvae, pupae, and the number of body casts present. Day 20 growth assessments (ash-free dry weight) were based upon surviving larvae only.

Replicate J of Sample 12551 (one larva surviving) had an apparent weighing and was excluded from the data analysis.

On occasion, the number of days that emerged flies survived was not recorded due either to escapes from emergence traps or oviposition chambers, accidental injury, or a laboratory error in recording the number of days until mortality for individual flies. A list of the affected test replicates is located at the end of Appendix C. For those flies where time-to-mortality was not recorded, they were included in the emergence tabulations but were excluded from the days survived tabulations.

### **RESULTS:**

Summary result tabulations for the *Chironomus tentans* whole sediment toxicity tests are located in Appendix A.

Group 1 Test Results: This group included Samples 12548 (BTOX-C-3). 12550 (BTOX-D-2),

12551 (BTOX-D-3). 12592 (BTOX-B-3). 12593 (BTOX-M), and 12609 (E-1 Dead Creek). Sample 12550 (BTOX-D-2) had a significant reduction in Day 20 growth and also significant reductions in proportion emerged and mean number of days male and female flies survived. Sample 12551 (BTOX-D-3) had significant reductions in Day 20 survival and also significant reductions in proportion emerged and mean number of days male and female flies survived.

Group 2 Test Results: This group included samples 12611 (E-3 Dead Creek), 12612, (BP-1 Borrow Pit). 12613 (BP-1 Borrow Pit duplicate), and 12614 (BP-3 Borrow Pit). Samples 12611 (E-3 Dead Creek). 12612. (BP-1 Borrow Pit), 12613 (BP-1 Borrow Pit duplicate), and 12614 (BP-3 Borrow Pit) had significant reductions for all response parameters evaluated.

Group 3 Test Results: This group included sample 12665 (Prairie Du Pont Creek 2). Sample 12665 had significant reductions in proportion emerged and mean number of days males and females survived.

<u>Total Ammonia and Sulfide</u>: Total ammonia concentrations were less than 25mg/L in porewater and less than 5 mg/L in overlying water. Total sulfide was not detected (<0.5mg/L) in any porewater samples during the initial acute toxicity testing, therefore, testing for sulfide in overlying water was not conducted.

### **QUALITY ASSURANCE:**

A standard reference toxicant SRT tests were conducted with representative batches of *Chironomus tentans*. The resulting LC50 values fell within control chart limits and were viewed as being acceptable.

Table 1. Test Conditions for the Midge (*Chironomus tentans*) Chronic Whole Sediment Survival, Growth, Emergence and Reproduction Toxicity Test.

ASSOCIATED PROTOCOL: EPA, 1997. <u>Draft</u> Methods for Measuring the Toxicity and Bioaccummulation of Sediment-associated Contaminants with Freshwater Invertebrates, <u>Second Edition</u> Method 100.5 (EPA/600/R-98/XXX).

1. Test type: Whole-sediment toxicity (static renewal)

2. Test temperature:  $23 \pm 1^{\circ}$ C

3. Light quality: Wide-spectrum fluorescent lights

4. Light illuninance: 500 to 1000 lux

5. Photoperiod: 16 hr. light, 8 hr. dark

6. Test chamber size: 300 mL beaker

7. Sediment volume: 100 mL (distributed to test chambers on the

day prior to administration of test organisms

8. Overlying water volume: 175 mL

9. Renewal of overlying water Twice daily

10. Age of test organisms: Larvae less than 24-h old

11. Number of organisms /

test chamber: 12 (acclimated to test conditions)

12. Number of replicate test

chambers / treatment: 16 (4 for 20-day survival and growth and 8 for emergence, reproduction, and fly

survival). An additional 4 replicates on Day

20 started as a source of auxiliary males.

13. Feeding regime: 1.0 mL Tetrafin slurry (1.0 mg/mL daily)

14. Aeration: None, unless dissoved oxygen in overlying

water drops below 2.5 mg/L. Supplemental water renewals may be implemented to raise

dissolved oxygen concentrations.

Table 1. Test Conditions for the Midge (Chironomus tentans) Chronic Whole Sediment Survival, Growth. Emergence and Reproduction Toxicity Test (continued).

15. Overlying water: Reconstituted water Formulated sediment (EPA/600/R-94/024, 16. Control sediment: section 7.2.3.2) Overflow screens, as needed 17. Test chamber cleaning: 18. Monitoring: Overlying water Temperature Daily, one replicate Dissolved oxygen At least three days weekly At least three days weekly pН Conductivity At least Days 0, 20, and end of test Alkalinity, hardness, ammonia At least Days 0, 20, and end of test Organism behavior Daily, all replicates 19. Test duration: On an individual sample basis, when no additional emergence has been recorded for seven consecutive days. 20. End points: Day 20 survival and growth (ash-free dry weight larvae dried 60°C-90°C overnight. then ashed at 550°C for 2 h). Reproduction (average hated eggs produced per female) and number of days emergent flies survived

21 Reference toxicant: 96-h acute, water only (KCI)

22. Test acceptability: Reference or Laboratory Control survival

should be 70% or greater on Day 20 with adherence to performance-based criteria outlined in EPA/600/R-98/XXX. Table 15.3

23. Statistical analysis and data interpretation:

Paired-sample hypothesis testing (e.g. t-test) versus the negative control and/or the

appropriate reference site. Proportion data transformed (Arc-sine (square-root)) before

analysis.

(male and female).

**APPENDIX A** 

Summary of Statistical Tests and Probabilities
Dead Creek *Chironomus tentans* Chronic Toxicity Test
BTR: 3615/3622

			Sur	rvival			SE	Growth	
			F-Test	T-Test			F-Test	T-Test	
Day 20		Proportion Surviving	Equal Variance <sup>2</sup>	Statistical Probability	Statistically Significant <sup>1</sup>	Avorage Equal Weight (mg) Variance	Equal Variance	Statistical Probability	Statistically Significant
12552	Control	0.81				2.679			
12548	Sample	0.63	0.218	0 092		3.186	0.579	0.225	
12550	Sample	0.31	0.033	0.053		0.937	0 396	0.026	•
12551	Sample	0 42	0.072	0.031	•	1 950	0 161	0.243	
12592	Sample	0.52	0 095	0.053		2.244	0 546	0.179	
12593	Sample	0.40	0 160	0000	•	2.216	0.946	0.195	
12609	Sample	0.54	0.079	0.088		2.501	0 869	0.376	

1. \* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05). 2. If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

	<del> v</del>	<del></del>	T	<del>- \</del>		Day 2	0 Data	<del></del>	<del></del>	
			Ì				Ashed Pan		8.6	
		<b>5</b> 4 4	<i>"</i>	5 4	Mean ~	Wt. + Larval		#.	Mean Wt.	Mean Wt
Sample		Start	#		Proportion		Larval Wt.			Reps I-L
Number	Replicate	Count	Surviving	Surviving	Surviving	(mg)	(mg)	Weighed	(mg)	(mg)
12552	i	12	10	0.83		2503.78	2487.15	5	3.326	
	J	12	11	0.92		2289.24	2269.48	11	1.796	
	K	12	9	0.75		2407.95	2388.70	6	3.208	
	L	12	9	0.75		2453.63	2432.17	9	2.384	
					0.81					2.679
12548	1	12	11	0.92		2267.44	2243.55	11	2.172	
	J	12	7	0.58		2142.36	2123.31	7	2.721	
	K	12	7	0.58		2408.08	2388.36	6	3.287	
	L	12	5	0.42		2306.17	2287.91	4	4.565	
	<b>-</b>	_	-	- · · <del>-</del>	0.63					3.186
	· <del></del>									
12550	<del></del>	12	0	0.00		0.00	0.00	0	0.000	
	j	12	11	0.92		2167.44	2136 97	11	2.770	
	ĸ	12	3	0.25		2182.25	2180.82	3	0.477	
	L	12	1	0.08		2491,36	2490.86	1	0.500	
	_	12	•	0.00	0.31	2431,00	2430.00	•	0.500	0.937
			<del></del>	···	0.51	<del></del>		<del></del>		0.007
12551	ī	12	8	0.67	·	2323.33	2292.54	8	3.849	
	j	12	1	0.08				•	*	
	ĸ	12	9	0.75		2315.55	2290.15	9	2.822	
	Ĺ	12	2	0.17		2392.79	2389.75	2	1.520	
	_	12	2	0.17	0.42	2002.70	2000.70	-	1.020	2.048
				<del></del>	0.42	- <del></del>			<del></del>	2.040
12592	<del></del> -	12	1	0.08		2446.30	2444.62	1	1.680	
12332	J	12	8	0.67		2192.47	2176.60	7	2.267	
		12		0.67		2192.47	2380.29	8	2.878	
	K L	12	9 7	0.75 0.58		2403.31 2397.21	2382.15	o 7	2.070 2.151	
	Ļ	12	1	0.56	0.50	2397.21	2302.13	/	2.151	2 244
	<del></del>		<del></del>	<del></del>	0.52			<del></del>		2.244
12593		12		0.42	<del></del>	2316.30	2302.13	5	3.234	
12393	•		5			2318.30				
	. J	12	5	0.42		2427.55	2422.12	3	1.810	
	K	12	5	0.42		2317.83	2307.51	5	2.064	
	L	12	4	0.33		2305.34	2301.83	2	1.755	0.010
	···		<del></del>	<del></del>	0.40					2.216
12609		12	11	0.92		2146.97	2131.58	11	1.399	<del></del>
12005	<u>'</u>	12	8	0.92		2205.14	2184.15	8	2.624	
	J	12		0.67		2509.45	2492.85		3.320	
	k		5					5		
	L	12	2	0.17	0.54	2288.60	2283.28	2	2.660	2.504
					0.54					2.501

<sup>\*</sup> A weighing error occurred. See Protocol Deviations.

J 12/22/99

# Summary of Statistical Tests and Probabilities Dead Creek Chironomus tentans Chronic Toxicity Test

BTR: 3615/3622

			Emer	dence.			Kepro	<b>deproduction</b>	
		Proportion Emerged	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant 1,3	Mean Eggs Hatched/ Female	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant 1.3
12552	Control	0.50				130 2			
12548	Sample	0.56	0800	0 398		526 5	0.034	0 052	
12550	Sample	0.02	0 324	0000	•	0 0	V V	0.079	•
12551	Sample	0.10	0.312	000.0	•	297 6	0.024	0.251	-
12592	Sample	0.52	0 121	0.260		301.8	0.223	0.160	
12593	Sample	0.54	0 032	0.312		430.2	0 271	0.041	
12609	Sample	0.42	0.120	0.066		576.3	0.094	0.018	

		Day	Days Survi	ived, Female	ale	Da	ys Sun	Days Survived, Male	a e
		Mean	F-Tost	T-Test		Mean	F-Test	T-Test	
		Days Survived		Statistical	Statistically	Days Survived	Equal	Statistical	Statistically
		/ Female	Variance	Probability	Significant	/ Male	Variance	Probability	Significant
1	-	ć				U <b>*</b>			
12552	Control	27.08				φ. Ω			
12548	Sample	2.4	0 805	0.296		3.7	0.836	0.198	
12550	Sample	0.8	0.221	0.028	•	0.0	, A V	0.000	•
12551	Sample	9.0	0.661	0.003	•	1.1	0.850	0.003	•
12592	Sample	2.5	0 860	0.369		3.1	0.618	0.074	
12593	Sample	3.6	0.634	0.174		4.1	0.793	0.344	
12609	Sample	3.5	0.209	0.250		2.4	0.824	0.034	•

1. \* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

2. There were not enough sample and/or control response variability to conduct a meaningful F-Test.

3. If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

į									Chronic End	points				
			End of Test		Eme	rged			Eggs		Nu	mber of Da	ys Survive	d
Sample Number	Replicate	Start Count	Larvae Survived	Females #	Males #	Total #	Proport.	Total #	Unhatched #	Eggs /female	Female days	Ave.	Males days	Ave.
12552	A	12	0	3	5	8	0.67	Ď	Ö	0	8	40	24	4.8
	B C	12 12	0	3 0	3 4	6 4	0 50	516 0	516 0	0	12 0	4 0 0 0	18 21	60
	Ď	12	0	3	2	5	0 33	1285	12	424	5	25	13	5.3 6.5
	E	12	0	2	8	10	0.83	0	0	0	4	20	38	48
	F	12	0	3	3	6	0.50	1862	11	617	13	43	8	4.0
	G H	12 12	0	2	5 0	7 2	0.58 0.17	902 1506	902 1508	0	5 6	25 30	23 0	4 6 0 0
Aver	age per sam			L			0.50	1300	1300	130	·	2.E		4.5
12548	Α	12	0	4	3	7	0 58	3064	170	724	14	3.5	15	5.0
	8 C	12 12	0 0	1	5 6	6 10	0 50 0 83	0 3452	0 1462	0 498	4 10	4 0 3 3	20 16	40
	D	12	0	2	8	10	0.63	3452 1674	810	432	6	30	18	27 26
	Ē	12	1	4	3	7	0.58	3591	376	804	9	2.3	15	50
	F	12	0	2	10	12	1.00	3559	49	1755	6	30	45	4 5
	G H	12 12	0 2	0	0 2	0 2	0.00 0.17	0	0	0	0	0.0 0.0	0 11	00 55
Avera	age per sam						0.56			526	L	2.4		3.7
12550	A	12	0	0	0	0	0.00	0	0	G	o o	0.0	0	00
	Б С	12 12	0	0	0	0	0.00	0	0 0	0	) 0	00	0 0	00
	D	12	ō	0	0	0	0.00	0	0	0	0	0.0	0	0.0
	E	12	0	0	Ö	ō	0.00	Ö	Ö	ō	ō	0.0	ō	0.0
	F	12	0	0	0	0	0 00	0	0	0	0	0.0	0	0 0
	G H	12	0	2	Ο Ω	2 D	0.17 0.00	0	0 D	0	13 0	65 50	0	0.0 0.0
Avera	age per sam						0.00 7			- 6		0 E		20
12551	Α	12	1	2	1	3	0.25	1254	12	621	6	3 0	5	5.0
	В	12	0	0	٥	0	0.00	0	0	0	C	0.0	0	0.0
	C D	12 12	0	0	0	0	0.00 0.00	0 0	0 D	0	0	0 0 0 0	0	0 0 0 0
	Ē	12	ŏl	Ö	Ö	ŏ	0 00	Ö	Ö	ō	ō	0.0	Ö	00
	F	12	0	0	0	0	0.00	0	0	0	G	00	0	0.0
	G H	12 12	0	1 0	6 0	7 0	0.58 0.00	2077 0	317 0	1760 0	2	2 0 0.0	25 0	4 2 0 0
Avera	age per sam						0,10			298	l	0.6		1,1
12592	Α	12	1	4	2	6	0.50	4022	373	912	19	4 6	9	4.5
	B C	12	0	3	2	5	0.42	0	0 ვე	0	3	1 0 2 7	6	3.0
	D	12 12	ŏ	3 1	5 3	8 <b>4</b>	0.67 0.33	700 0	30 0	223 0	6 3	30	13 6	26 20
	Ē	12	ŏ ,	3	5	8	0.67	3090	224	955	11	37	21	4.2
	F	12	0	0	0	0	0 00	0	0	0	0	0.0	C	0.0
	G H	12 12	0	4	6 5	10 9	0.83 0.75	1076 530	200 115	220 104	13 6	· 33	31 10	52 33
Avera	age per samp						0.52	330		302		2.5		31
12593	A	12	0	2	5	7	0.58	1822	140	841	S	4.5	17	3 4
	B C	12 12	0	3 5	3 1	6 6	0.50 0.50	900 3974	900 339	0 727	9 17	30 34	6 7	2 0 7.0
	D	12	ö	4	1	5	0 30	3678	435	861	17	40	Ó	0.0
	E	12	0	1	5	6	0.50	0	0	0	0	0.0	14	47
	F	12	0	2	6	8	0.67	941	75 800	433	6	40	27	54
	G H	12 12	0	4 1	<b>4</b> 5	8 6	0.50	3118 0	800 0	580 0	14	35 60	20 25	5.0 5.0
Avera	age per sam						0.54		<u>~_</u>	430		36		41
12609	A	12	0	3	3	6	0 50	1628	1181	216	11	37	9	3.0
	E C	12 12	0	3 3	1 4	<b>4</b> 7	0.33	4004 2089	2258 560	582 510	11 18	37 60	0 17	00 43
	D	12	ö	1	4	5	0 58 0 42	1102	13	1089	5	6 O	8	27
	Ε	12	0	3	6	9	0.75	395ê	271	1229	13	4 3	25	5 0
	F	12	0	4	5	9	0.75	4179	240	985	15	4 0	23	4.6
	G H	12 12	0	0	0	D 0	0 00	0 0	0	0	0	00	ົນ 0	0 0 0 0

15/55 543

Summary of Statistical Tests and Probabilities
Dead Creek Chironomus tentans Chronic Toxicity Test
BTR: 3629

			Sur	urvival			Gro	Growth	
		1	F-Tost	T-Test			F-Test	T-Test	
Day 20		Surviving	Variance	Probability	Significant Significant	Weight (mg) Variance	Variance	Probability	Significant <sup>1</sup>
12622	Control	0.46				2.959			
	Sample	0.00	`< Z	0000	•	0000	Z Z Z	0000	•
	Sample	0.00	NA.	0000	•	000.0	ZAZ	000.0	•
12613	Sample	00 0	NA,	0000	•	000.0	NA,	000.0	•
12614	Sample	90.0	NA,	0.003	•	0.959	Z Y Z	0.000	•

1. \* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

<sup>2.</sup> There were not enough sample and/or control response variability to conduct a meaningful F-Test.

			1			Day 2	0 Data			
			ł			•	Ashed Pan			
			ſ		Mean	Wt. + Larval	and Ashed	#	Mean Wt.	Mean Wt.
Sample		Start	#	Proportion	Proportion		Larval Wt.	Organisms	within Rep	Reps I-L
Number	Replicate	Count	Surviving	Surviving	Surviving	(mg)	(mg)	Weighed	(mg)	(mg)
12622	1	12	7	0.58	~ <u></u>	2139.80	2123.57	6	2.705	
	J	12	4	0.33		2396.04	2387.54	3	2,833	
	K	12	7	0.58		2303.40	2289.39	5	2.802	
	L	12	4	0.33		2322.18	2315.19	2	3.495	
				··	0.46		<del></del>	<del></del>		2.959
12611	1	12	0	0.00		0.00	0.00	0	0.000	
	J	12	0	0.00		0.00	0.00	0	0.000	
	K	12	0	0.00		0.00	0.00	0	0.000	
	L	12	0	0.00		0.00	0.00	0	0.000	
	<del></del>			<del></del>	0.00		<del></del>		<del></del>	0.000
12612	<del></del>	12	0	0.00		0.00	0.00	0	0.000	<del></del>
	J	12	0	0.00		0.00	0.00	0	0.000	
	K	12	0	0.00		0.00	0 00	0	0.000	
	L	12	0	0.00		0.00	0.00	0	0.000	
					0.00	<del></del>				0.000
12613	<del></del>	12	0	0.00		0.00	0.00	0	0.000	
	J	12	0	0.00		0.00	0.00	0	0.000	
	K	12	0	0.00		0.00	0.00	0	0.000	
	L	12	٥	0.00		0.00	0.00	0	0.000	
	<del></del>				0.00					0.000
12614	<del></del>	12	0	0.00		0.00	0.00	0	0.000	
	J	12	0	0.00		0.00	0.00	0	0.000	
	K	12	3	0.25		2251.81	2240.30	3	3.837	
	L	12	0	0.00		0.00	0.00	0	0.000	
					0.06					0.959

# Summary of Statistical Tests and Probabilities Industriplex *Chironomus tentans* Chronic Toxicity Test BTR: 3629

			Emel	Emergence			Repro	Reproduction	
			F-Test	T-Test		Mean Eggs	F-Test	T-Test	
		Proportion Emerged	Equal Variance	Statistical Probability	Statistically Significant <sup>1,3</sup>	Hatched/ Female	Equal Variance	Statistical Probability	Statistically Significant 1.3
!									
12021	Control	0.43				2 700			
12611	Sample	0.01	0.004	0.000	•	00	NA.	0 003	•
12612	Sample	0.05	0.365	0.000	•	0.0	À Z	0.003	•
12613	Sample	0 08	0.694	0.002	•	127 0	0.434	0.033	•
12614	Sample	0 14	0.791	0.008	•	106.0	0.063	0.017	•
		Day	's Survi	Days Survived, Female	ale	Da	ys Sur	Days Survived, Male	le
		•	F-Test	T-Test			F-Tost	T-Test	
		Mean	Equal	Statistical	Statistically	Mean	Equal	Statistical	Statistically
		Days Survived	Variance	Probability	Significant 1,3	Days Survived Variance	Variance		Probability Significant 1,3
12622	Control	ა -				4.9			
12611	Sample	90	0.568	0.004	•	0.0	NA <sup>2</sup>	0.000	•
12612	Sample	00	× V V	0.000	•	0.7	0.413	0.000	•
12613	Sample	03	0.308	0.000	•	0 8	0.997	0000	•
12614	Sample	0 8	0.965	0.002	•	1.2	0.237	0.001	•

<sup>1. \*</sup> A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05). 2. There were not enough sample and/or control response variability to conduct a meaningful F-Test.

<sup>3.</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

,						············			Chronic End	points				
]			End of Test		Emer	aed			Eggs		Ne	mber of Da	ıys Survived	1
Sample		Start	Larvae	Females	Males	Total	Proport.	Total	Unhatched	Eggs/	Female		Males	<b>-</b>
Number	Replicate	Count	Survived	#	#	#	, , , , , ,	#	#	Female	days	Ave.	days	Ave.
12622	Α	.12	0	4	8	12	1.00	265	25	64	16	4.0	35	5.0
ł	5	12	0	3	1	4	0.33	0	O	0	10	33	5	50
i	С	12	0	1 1	3	4	0.33	1361	6	1355	4	4.0	16	5.3
<b>S</b>	D	12	0	1	1	2	0.17	883	100	783	3	30	2	2.0
1	E	12	0	3	2 6	5 9	0.42 0.75	2062 2576	143 75	640 834	5 8	2.5 4.0	و 26	45 43
ł	G	12   12	1	3	3	6	0.75	25/6 2447	75 174	758	13	4.3	26 18	6.0
ł	Н	12	Ö	1 0	1	1	0.08	0	0	0	0	0.0	7	7.0
Aver	age per sam			L¥	'		0.45			554	<u></u>	3.1	<del></del>	4.9
12611	A	12	٥	٥	0	0	0.00	9	ē	0	0	0.0	0	0.0
ł	8	12	. 0	0	0	D	0.00	Đ	ō	٥	0	0.0	0	0.0
}	С	12	0	0	0	0	0 00	ō.	ē	D	D	0.0	0	0.0
į	D	12	0	0	0	0	0 00	0	9	0	0	0.0	٥	0.0
<b>{</b>	Ε	12	0	0	0	0	0.00	ε	Ĉ.	0	0	00	D	סס
1	F	12	0	0	0	0	0.00	5	ξ	0	0	0 0	Ō	0.0
ŀ	G	12	0	0	0	0	0.00	ε	5	Ģ.	0	0.0	0	00
A	<u> </u>	12	00				0.08	<u> </u>	<u> </u>	<u>c</u>	5	5.0 0.6	0	0.0
12612	age der sam. A	12 T	Ö	0	0	0	0.01		<del></del> -	<del></del>	0	0.6	0	0.0
12012	ŝ	12	č	٥	0	0	0 00 0	5	-		0	90	C C	0.0
ļ	Č	12	Ö	0	Õ	0	0.00	÷	:	ζ	0	0.0	٥	0.0
ł	Ö	12	Ö	Ö	Ö	0	0 00	3	÷	ě	Ö	0.0	Č	00
j	£	12	0	0	Ō	0	0 00	9	e	G	0	0.0	0	00
	F	12	0	0	0	C	000	2	:	C-	0	0.0	Э	00
l	G	12	0	0	0	0	0.00	٥	5	c	0	0.0	0	0.0
	н	12	0	2	3	5	0 42	<u> </u>	<u> </u>	<u> </u>	<u> </u>	0.0	17	57
	age per sam						0.05			C	<del></del>	0.0		0.7
12613	A	12	0	0	0	0	0 00	C	٥	0	0	0.0	0	0.0
	8 C	12 12	0	0 3	1 4	1 7	0.08 0.58	ე 3591	5 548	0 1016	0 8	0.0 2.7	3 13	30 33
	0	12	Ö	0	0	0	0.00	0	543 ()	0.	ì	00	0	0.0
	E	12	ő	0	0	0	0.00	G	C C	2	٥	00	0	0.0
	F	12	ő	0	٥	0	000	0	Ö	č	lŏ	0.0	ō	0.0
	Ġ	12	ŏ	Ö	Ö	ō	0.00	ō	Ö	ō		0.0	Ō	0.0
	н	12	0	0	0	0	0.00	ō	2	Ċ	0	0.0	0	0.0
Avera	age per sam	ple					0.08			127		03		0.6
12614	4	12	0	3	6	9	0.75	612	3	283	o,	30	22	3.7
	Б	12	0 1	0	0	0	0 00	O	Ç	ę	0	0 0	0	0.0
	C	12	0	0	0	0	0.00	ĵ	c	Ĉ	0	0.0	0	0.0
	Ď	12	0	0	0	0	0.00	0	C	C Ē	0	0.0	0	00
	E	12	0 }	0	0	0	0.00	0 0	C 0	÷	0	0 0 0.0	0	00
	G	12 12	0	3	1	4	0.00	2336	400	645	6	3.0	6	60
	H	12	0	0	ó	0	0 00	2330 0	400 0	020	Ö	0.0	0	0.0
Avera	age per sam						0.14		<u>-</u>	105	·	0.8	<u>-</u>	1.2



Summary of Statistical Tests and Probabilities
Dead Creek Chironomus tentans Chronic Toxicity Test
BTR: 3641

			Sur	Survival			Gro	Growth	
			F-Test	T-Test			F-Test	T-Test	
		Proportion	Equal	Statistical	Statistically	Avorage	Equal	Statistical	Statistical Statistically
<b>Day 20</b>		Surviving	Variance	Probability	Probability Significant	Woight (mg) Variance	Variance	Probability	Probability Significant
12668	Control	0.65				2 923			
12665	Sample	69.0	0 689	0.404		3.074	0 899	0.400	
	į	ı	ì						

1 \* A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05)

			1			Day 20	0 Data			
			ł			Ashed Pan	Ashed Pan			
			1		Mean	Wt. + Larval	and Ashed	#	Mean Wt.	Mean Wt.
Sample		Start	#	Proportion	Proportion	Dry Weight	Larval Wt.	Organisms	within Rep	Reps I-L
Number	Replicate	Count	Surviving	Surviving	Surviving	(mg)	(mg)	Weighed	(mg)	(mg)
12668	J	12	7	0.58		2271.36	2263.76	3	2.533	
	j	12	10	0.83		2398.12	2386.84	4	2.820	
	ĸ	12	10	0.83		2448.78	2430.38	8	2.300	
	L	12	4	0.33		2453.15	2445.07	2	4.040	
					0.65					2.923
12665	<del></del>	12	11	0.92		2346.80	2326.20	11	1.873	
	J	12	3	0.25		2290.05	2282.89	2	3.580	
	K	12	9	0.75		2420.25	2395.18	8	3.134	
	L	12	10	0.83		2488.41	2484.70	1	3.710	
					0.69					3.074

# Summary of Statistical Tests and Probabilities Industriplex Chironomus tentans Chronic Toxicity Test

BTR: 3641

			Eme	Emergence			Repro	Reproduction	
	; ; ;	Proportion Emerged	F-Test Equal Variance	T-Test Statistical Probability	Statistically Significant	Mean Eggs Hatched/ Female	F-Test Equal Variance	T-Test Statistical Probability	T-Test Statistical Statistically Probability Significant
12668	Control Sample	0 69 0 13	0 454	000 0	٠	354.2 248.8	0 7 10	0.317	
		Day	Days Surviv	ved, Female	ale	Day	ys Surv	Days Survived, Male	<u>a</u>
		Mean	F-Test Equal	T-Test Statistical	Statistically	Mean	F-Test Equal	T-Test Statistical	Statistically
,		Days Survived	Variance	Probability	Probability Significant '.*	Days Survived Variance	Variance		Probability ignificant '.*
12668 12665	Control Sample	3.6	0.049	0.003	•	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0.007	0.007	•

1. A statistically significant reduction in the response was observed (relative to the Laboratory Control, P<0.05).

<sup>2.</sup> If the F-Test result was significant (relative to the Laboratory Control, P<0.05), the T-Test was performed using unequal variances.

									Chronic End	points				
			End of Test		Eme	rged			Eggs		Nu	mber of Da	ys Survive	<u>d</u>
Sample Number	Replicate	Start Count	Larvae Survived	Females #	Males #	Total #	Proport.	Total #	Unhatched #	Eggs /female	Female days	Ave.	Males days	Ave.
12668	Α	12	0	6	2	8	0 67	3669	435	539	18	3.6	10	50
	В	12	0	4	3	7	0.58	2275	350	481	18	4.5	9	3.0
	С	12	D	2	5	7	0.58	1372	250	561	10	5.0	20	4.0
	D	12	0	2	8	10	0.83	0	0	0	3	3.0	33	4.7
	E	12	0	l 1	8	9	0.75	0	0	0	2	2.0	30	38
	F	12	0	4	7	11	0.92	703	207	124	14	35	32	5.3
	G	12	٥	4	7	11	0 92	2637	2637	0	14	35	26	37
	H	12	0	11	_ 2	_ 3	0.25	1144	16	1128	4	4.0	5	5.0
Ave	erage per san	nple					0 69			354		3.6		43
12665	Α	12	0	0	0	0	0 00	0	0	0	0	0.0	0	00
	В	12	0 .	0	0	0	0 00	0	0	0	0	0.0	0	0.0
	С	12	٥	0	0	0	0 00	G	0	0	0	0.0	0	0 0
	D	12	0	4	1	5	0.42	3834	191	911	15	3.8	6	60
	E	12	0	0	0	0	0.00	0	0	0	0	00	0	00
	F	12	0	1	4	6	0.50	1104	24	1080	5	50	20	50
	G	12	0	٥	0	0	0 00	٥	0	0	0	0.0	0	0 0
	H_	12_	0	٥	0	1	0.08	0	0	0	0	0.0	0	0,0_
Ave	race per sam	ple					0.13			249		11		1.4

RHB Izlz1

# **APPENDIX B**

Page

		Agu	Aquatec E	3iolog	tec Biological Sciences	75 Green Mountain Drive South Burlington, V1 05403 TEL, (002) 660-1630	hive 05403
			Chain-of-C	-or-Cus	tody/Record	( FAX (002) 650-3109	
COMPANY INFORMATION	COMI'	ANY'S 1130	COMPANY'S PROJECT INFORMATION	NOLLVY	SHIPTING INFORMATION	VOLUME/CONTAINER TYPY!/ PRESERVATIVE	
Name: Menzie Gura & Associates	Project N	anne; Dear	Project Name: Dead Greek Sedingal Tox	mind Fox	Carrier: 40C		
Address: One Counthouse Lane, Suite 2 Chelmsford, MA 01024	Project Number:		99033		Airbill Manber:		
Telephone: (978) 453-4300	Sample	Sampler Name(s):					
Facsimile: (978) 453-7260					Date Shipped:	     	
Contact Name - Ken Centelo, Ph.D.	Ouote #.	3/00	Client Code:MENCUR		Hand Delivered: Yes No	i gail	
SAMPLE DENTIFICATION	COLLECTION	טוגעוו	COMPOSITE	MATIRIX	ANALYSIS / IREMARKS	NUMBER OF CONTAINERS	,
				Sediment	Hyalolla aztaca 10-d Survival & Growth		!
					Hyalella azteca 42 day Chronic Toxicity Chironomus tentans 10 d Survival & Growth	1,00%	
			,		Chironomus tentans Chronic Toxicity		
				Sediment	Hyatella azteca 10-d Survival & Growth		
(-2-)-0-0					Opposite Agree 12 day Chronic Foxicity Chironomus fortlans 10 d Survival & Growth	150,6	
		:	· · · · · · · · · · · · · · · · · · ·	Sediment	Chiromonus tentans Chronic Toxicity /		:
				;	Hyalella azteca 42 day Chronic Toxicity		
		<del></del>			Chirononnes tentans 10-a Salvival & Orowin Chirononnes tentans Chronic Toxicity		
	-			Sedimont	Hymfolla uzfaca 10.d Shuvival & Growth		
					Chiranonnus Indians 10 d Survival & Grawth		
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					Plyation against 20 Commission of Physician Physician Conference 10 d Guident & Grandin		***
	<del></del>				Chironopurs features Chronic Toxicity		1
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( VIVVO) / YOUVES			1 WE BASSING IN GENERAL	(5.1)	Notes to Lab. Cooler ambient temperature upon delivery.	Do , Louis delivers	
(2) (adhama): (adhama) (2)	1/2//5/	00	marking) - Carnon	/-O			<del></del>
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South Budington; VT 05403

TEL: (802) 860-1638 FAX: (802) 658-3189

75 Green Mountain Drivn

Aquatec Biological Sciences Chain-of-Clistody Record

NOTES TO SAMPLER(S): We recommend nesting samples in ice to maintain 4"C during VOLUME/CONTAINER LYPL / shipment. Please cover sample labels with clear tape (labets are not waterproof) NUMBER OF CONTAINERS PRESCRAMIVE Notes to Lab. Coaler ambient temperature upon delivery: (=0:J T:03 1503 1=0.9 1:0.7 plastic ادر؛ ١ 20V Chirononns fentans 10.4 Survival & Growth Chironomus fordans 10 d Sarvival & Growth Chironomus tentans 10-d Survival & Growth Chironophus fentans 10 d Sarvival & Growth Chirononnes fontaine 10, d Survival & Growth Hyalalla azlaca 42-day Chronic Foxicity Hyalella azteca 42 day Chronic Luxicity Hyalella aztoca 42-day Chionic Toxicity Hynlella azteca 10 d Sarvival & Growth Hyalalla aztaca 42-day Chronic Toxicity Hyalalla aztaca 42.-day Ghronic Toxicity Phalalla aztaen 10.0 Sarvival & Growth Hyalella azfeca 10.d Survival & Growlli Hyalella aztaca 10-d Survival & Growth Hyalella azteca 10-d Survival & Growth Chirononnis tentana Chronic Toxicity Chirononus tentans Chronic Toxicity Chironomus tentans Chronic Toxicity *Chironomus tentans* Chronic Toxicity Chiranonnes tantans Chronic Toxicity ٩ N NOTIVERSINE STREET ANALYSIS / REMAIRES ۲<u>ر:</u> ۲ Client Code:MENGUR | Hand Delivered: Airbill Number: Date Shipped: Carrier: MATTRIX Sediment Project Name: Dead Greek Sediment Tox AXAAA MARKELI Received by (signature) COMPANYS PROJECT INFORMATION Received by: (signalure) Received by: (signature) THEOMNOD CRAII 37.619 Sampler Name(s): Project Number: 1 09:07 7 10:00 1 IMI -COLLECTION Ouole #: 11/1 Address: One Courthouse Lane, Suile 2 BTOX-0-3-2 COMPANY INFORMATION Contact Name, Ken Gerreto, Ph.D. Name: Menzie Gura & Associates BIDX-C-3-2 2-2-7-Xald SAMPLE IDENTIFICATION Chelmsford, MA 01824 BTOX - 1)-3 BTOX- C-2 (978) 453-7260 Telephone: (970) 453-4300 Relinquished by: (signature) Relinquished by (signalure) Facsimile:

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'5 Green Mountain Drive

South Burlington, VT 05403 NOTES TO SAMPLEMS): We recommend needing samples in ice to maintain 4°C during # 15 TEL: (002) 860-1630 VOLUME/CONTAINER LYPY / shipment. Phase cover sample tabets with clear tape (tabets are not waterproof) NUMBER OF CONTAINERS PRESERVATIVE Notes to Lab: Gooler ambient temperature upon delivery: 5'0= 20. 7,0,5 5005 1:0,5 plastic Jeb I Chimmonnes tentines 10 d Sarvival & Growth Chirononnes fantana 10-d Survival & Growth Chirononus fentana 10 d Survival & Growth Chiranannus tantans 10 d Sanvival & Growth Chiranannes fantanes 10 d Sanvived & Crowth Hyalolla axfoon 42 day Chronic Loxicity Hyalella natuca 42-day Chronic Toxicity Hyalalla azfaca 10.d Survival & Growth Hyalella axfeca 42.day Chronic Toxicity Hyalella azteca 42.day Ghronic Toxicity Hyalalla agleca 10.d Survival & Growth Hyalella axfoca 10 d Survival & Growth Hyalolla aztaca 42-day Chronic Toxicity Hyalella aztaca 10-d Survival & Growth Hyalella aztoca 10.d Survival & Growth Chiranonnus fentans Chronic Toxicity Chitomonus fantaus Chronic Toxicity Chiranonnus fentans Chronic Toxicity Chironomus fentans Chronic Toxicity Chiromonnes tentana Chronic Texicity ž NOTIVINIO INFORMATION ANALYSIS / REMARKS Aquatec Biological Sciences Chain-of-Gustody/Record Hand Delivered: Airbill Number: Date Shipped. Carrier: Client Code:MUNCUIR XISI.VW Sediment Sectioner! Sediment Project Name: Dead Greek Sudiment Tox ROMPANYS PROJECT INI GENARITON Received by: (signalum) Received by (signaline) (Secentral by: (signature) GRAB | COMPOSITE Project Number: 99033 17.09 Sampler Name(s) 00:0/16 COLLICION Quole 11. Address: One Courthouse Lane, Suite 2 COMPANY INFORMATION Contact Name - Ken Cereeto, Ph.D. Name: Menzie Gura & Associates SAMPLE TOLINITIFICATION Chelinslaid, MA 01824 BTOX-D-2-2 (971) 453 7260 Telephone: (978) 453-4300 610X-C-3 (am) Endished by (signs/me) Characth Mell Relinquenced by (signature) GTOX- O-DPAOX D AND TOOCH doc Facsimile

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# CHAIN OF CUSTODY RECORD

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		Analyses Required		CHELMSFORD, MA 01024
13 /3 / 6 /01 EDIVO		المرابع المراب		TEL: 970/453-4300 FAX: 970/453-7260-
SAMPLERS C. Manzey J. Folgerile	. Forgards	- - - - - - - - - - - - - - - - - - -		
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DATE: 10/6/99		(T)		TEL: 978/453-4300 FAX: 978/453-7260	
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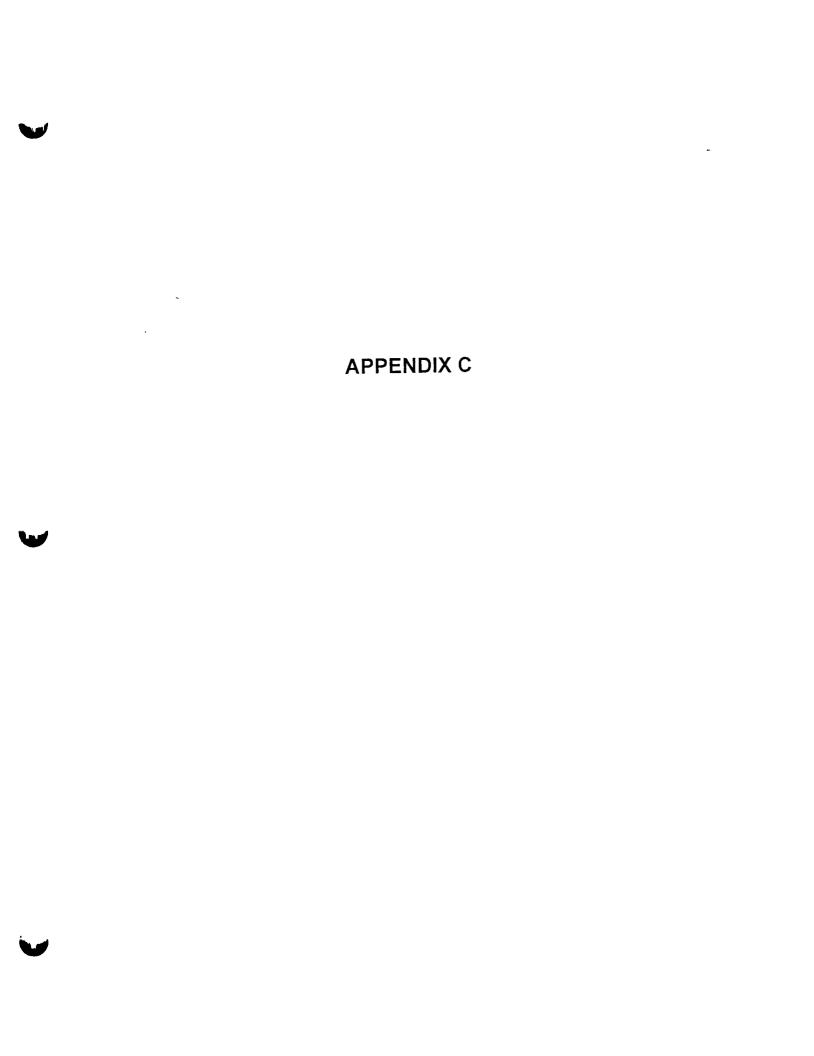
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Laboratory:	Mory: Aquatach				Phona:						
Contac	Contact Person: Dh. On Dry C.	)OOr	ישיל.								-



# Midge (Chironomus tentans) Chronic Toxicity Test Day 20 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3186 / 3189
	Test Start: October 19, 1999	Day 20: November 8, 1999

Sample	Repl.	Initial # Larvae	# Alive	11/8/99 Init.	Larvae preserve d? Y/N	Crucible #	# Weighed	Ashed Pan Wt.	Ashed Pan Wt. + Larval Dry Wt.	Ashed Pan and Ashed Larvai Wt.
12548	l	12 C	5P51	Tm	Υ	1	11	2238,99	2,267,44	2,243,55
	J	12	DP 7L	TM	Υ	2	7	2120.34	2,142,36	2, 123.31
	K	12	1P6L	TM	Υ	3	6	2385.96	3,403.08	2,388.31
	L	12	1P 4L	TM	Y	4	4	1286.61	3306.17	2.287.91

12550	1	12	OPOL	TM	Υ	5		2313.28		
Ī	J	12	OPIL	Th	Y	6	111	2129.95	2,167,44	2,136,97
very small *	K	12	OP 3L	Tm	Y	7	3	2180.96	2182,25	2,180.87
very small *	L	12	OP IL	TM	Y	8	1	2491.01	2,491.36	2,490,86
(3)			······································	<del></del> -		· · · · · · · · · · · · · · · · · · ·			<del></del>	

12551	l	12	OP 8L	TM	Υ	9	8	2282.84 2,323,33 2,392.54
Small-	J	12	OP IL	TM	Y	10	ì	2321.00 2,321.45 2,321.89
	K	12	OP 9L	TM	Y	H	19	2282.20 2,315.55 2,2901
Isnall I	> L	12	OPaL	TM	Y	12	12	2389.33 2,392,79 2,389,75
1 '''' '						į		,

12552	1	12	5 P 5 L	Tm	Y	[ 13	5	2484.61 2,503.78 2,487.15
	J	12	0P 11L	TM	Y	14	11	2263.172,289,242,219.48
	K	12	39 6L	TM	Y	15	6	2385.21 2,407.95 2388.70
	L	12	0P 9L	TM	Y	16	9	2426.11 2,453.63 2,432,17

		111V	} <u>'</u>	1 7	1	62444.71 2,446,30 3,444,60
body 118 J 12	OP 7L	Tm	Υ	18	7	2174.02/2/19247/2/176/60
County K 12	IP 8L	Tm	Y	19	8	2377.44-2,403,31 2,4350,19 1
(8 50 L 12	0P 7L	TM	Y	20	17	2380.32 2,397.21 2,382.15

Date / Time / L	nit Larvae in oven: ɪ/l	22/99 17:4	5 M Date / Time / Init. Larv	ae out of oven: 11/13/99	Juit 16 300:0
			Date / Time / Init. La		141111111111111111111111111111111111111
Balance QC:	Initial (20 mg = 2000)	(34) Fi	nal (20 mg = 2000 .03 mg)	Balance Asset #:	
Date/time In	Temp(°C)	Init.	Date/time out	Temp(°C) 79°C	Init.
Comments:					

Reviewer: Date: 12/21/99 . ctday20doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

P= pupe L= larva

O(orrection 7m 11/8/99

# Midge (Chironomus tentans) Chronic Toxicity Test Day 20 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3186 / 3189
	Test Start: October 19, 1999	Day 20: November 8, 1999

Sample	Repl.	Initial # Larvae	# Alive	11/8/99 Init.	Larvae preserve d? Y / N		# Weighed	Ashed Pan Wt.	Ashed Pan Wt. + Larval Dry Wt.	Ashed Pan and Ashed Larval Wt.
12593	1	12	OP5L	Tm	Υ	21	5	2300.33	2,318,30	2,302,13
	J	12	ap3L	m	Υ	22	3	2421.67	2.427.55	2,422,12
	K	12	OP5L	TM	Y	23	5	33 2306.A.	2,317.83	2,307,51
	L	12	ap al	TM	Y	24	2	2301.54	2305.34	2,301,83

12609	1	12	OP IIL	TM	Y	6	11	2,129.87 3,146.97 2,131.58
	J	12	088L	TM	Y	7	8	2,180.43 2,205.14 2,184.15
	K	12	0P5L	TM	Y	8	5	2,490,992,507.45 2,492.85
	L	12	DP 2L	TM	Y	9	12	2,282.83 2,283.60 2,283.28

	1	12	Y		
1	J	12	Y		
1	K	12	Y	- 1	
1	L	12	Y		
		12			

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		ورواكات والمراض				
	11	12	Y		1	
	J	12	Y			· · · · · · · · · · · · · · · · · · ·
1	К	12	Y			
Ì	L	12	Y			
1			 			 

Date / Time / Init. Larvae in oven: 11/36/6:45	Date / Time / Init. Larvae out of oven: 11/27 15:00 ゴケ
Date / Time / Init. Larvae in furnace! 1137 15:15	Date / Time / Init. Larvae out of furnace:
Balance QC: Initial (20 mg = 入の ひ, 0 7 ) Final (2	20 mg =λόεο,ο δ ) Balance Asset #:
Date/time In // Ag. 45 Temp(°C) (€) Init. ((5	Date/time out 11/27 is to Temp(°C) Init
16	3
Comments:	

Reviewer: Date: 12/21/99 . ctday20doc

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

12

Project: 95033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 Sample / Repl. Response 21 22 23 24 25 26 27 28 29 30 31 # Males 12548 A emerged Male Time to (1d (11/13) 69,731 Mortality (days) # Females emerged 50,1124 рd Time to Mortality 11/13 (days) Cumulative 3 2 number emerged 342 342F W/5/8D wi # Pairings 548 A & A.E. # Egg Case 1,414 # Eggs / 1,650 Time to hatch / ~ 70 mhatches # hatched 1426 11/23/AUTHOLCHEC # Males ID 12548 B emerged Male Time to 00,114 Mortality (days) # Females emerged Females Time to Mortality (days) number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12548 C Male Time to Mortality (days) Females 30,117 Time to Mortality (days) Cumulative 2 number emerged Not 548E # Pairings # Egg Case 616 39 uninatesed Time to hatch / # hatched 17/17 11/10 11/12 Init./Date 11/13 11/18 (1999)Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not

Review: Date: 12/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

surviving. P = pupa

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 Sample / Repl. Response 21 22 23 24 25 26 27 28 29 30 31 # Males 12548 D 11 (323418 emerged Male Time to 60 4/23 31/15 Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12548 E emerged Male Time to 5923 Mortality (days) # Females emerged Females Time to Mortality (days) 7 number emerged 4548F2 # Pairings # Egg Case # Eggs / سکوومنه Time to hatch / r isciudu # hatched # Males 12548 F emerged Male Time to 4d 70 1423 Mortality (days) emerged Females 4du/23 Time to Mortality (days) Cumulative 3 9 10 number emerged 2)/548° # Pairings # Egg Case # Eggs / Time to hatch / # hatched\_ 11/13 11/14 11/10 11/16 Ww 11/9 11/11 11/18 Init./Date 11/12 1/17 45 (1999)Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not

surviving. P = pupa

Review: Date: 12/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Female dead III and Cidays21-31 egg case deposited III and Company

BCI, 99033 N	I-C Dead Cr	eek	BTF	R: 3615	3622			Tes	t Start:	10/19/9	9	
Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12548 G	# Males emerged		<del> </del>		-							
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Monality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12548 H	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged			1								
	Females Time to Mortality (days)											
	Cumulative number emerged				ļ			ļ				
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched			<u> </u>								
	T THE LIBITOR INCO							11/15	11/16	11/17	11/18	

Review: Date: 12/2/59
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/20/99

Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12548 A	# Males emerged	·	†									
	Male Time to Mortality (days)		<del> </del>						····			<del> </del>
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged		7									
	# Pairings											
	# Egg Case				****		<u> </u>		,			
	# Eggs / Time to hatch / # hatched									<u></u>		
12548 B	≄ Males emerged		1				ì	1				1
	Male Time to Mortality (days) # Females		40/1/25	70/109			3/1%	104,2/2				
	emerged			1								
	Females Time to Mortality (days)			49 11/20								
	Cumulative number emerged		2	4			5	6			ļ	
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12548 C	# Males emerged		ī			IDI						
	Male Time to Mortality (days)		40,135			od 2d	u					
	# Females emerged			1	•	1						
	Females Time to Mortality (days)			3411/25	· [	NE CUSAL						
	Cumulative number emerged		4	(e ]		9						
	# Pairings			11 54 8 22 E		1-						
	# Egg Case				۱٬۱ عاد	By Mila	i	10 Small				
	# Eggs / Time to hatch / # hatched				1,663 4250 un.	1/29 ~ 2Li	c unhilai	0% hat	in 12/2	egg (ase	disint qi	oting
		11/20	1,1/21 1m	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30

Emergence scoring: Record any purpae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/21/59
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	<b>21</b> 32	22	<b>23</b>	24	25 36	36	38	<b>-28</b>	- <del>29</del> -	-30 41	<del>-31</del> 42
12548 D	# Maies		1 - 1 -		1	1	<del></del>	<del>                                     </del>			<del>                                     </del>	
14340 D	emerged		1									
	Male Time to	<u> </u>				λ.						
	Mortality (days)	1	}	}	}	1935	}	}		]	}	]
	# Females		<del>                                      </del>		<del> </del>	<u> </u>	<del></del>	<del>                                     </del>				
	emerged		•	٠,	z.		l				ļ	
	Females	71 70	<del> </del>		<del> </del>			<del> </del>	<del> </del>	<del>├</del>	<del> </del>	<del> </del>
	Time to Mortality	31 30	.			Ì	{	ł	1	}		ł
	(days) Cumulative	n/23 1/2	<u> </u>		<u> </u>	<u> </u>		<del> </del>	<del> </del>	<del> </del>	ļ- <b>-</b>	
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	# Eggs /				100	marato	11139					
	Time to hatch / # hatched	1		l	110	orinated or/oliste	11/30		ł		1	1
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Emergence scoring: Record any pupple which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Test Dey correction

"Indeed to flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/21/69
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

sample / Repl.	Response	240	222	02	T 04/	0.5%	7000	070	200	20-	20-	1 24
ample / Repl.	Response	25/2	<b>22</b> 33	<b>23</b>	35	36	<b>26</b> 37	27 38	<b>28</b> 39	2 <del>9</del> 40	30-	31
12548 G	# Males emerged											
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12548 H	# Males emerged					l						
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	Time to hatch / # hatched									-	}	
	Init./Date	11/20	11/21	11/22	11/23	11/24	1477	11/26	11/27	11/28 TM	11/29	11/30
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viving. $P = p$	ung. Kecer Juna	a any po	apac wiii	ion die (i	D) DOIOIN	cine.g	C.1.0C. D	acaa	101 11103	••••	norge o	at are m
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Review: \_\_\_\_\_\_Date: 11/21/49
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12548 A	# Males emerged		<del> </del>		<del> </del>		+	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	
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	emerged	1		j			İ			106		
	Females Time to Mortality			T	1		1					
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	# Pairings									101		
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12548 B	# Males emerged											
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	Time to Mortality (days)	]	]	1_						Im		<u> </u>
	Cumulative number emerged									1219		
	# Pairings			<del> </del>								
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	Time to hatch / # hatched					<u> </u>				ļ	<u> </u>	
12548 C	# Males emerged		-	-						}		
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	emerged			<del> </del>	<del></del>		-}	ļ	<b></b>	<del> </del>	<del>}</del>	<del> </del>
	# Pairings				]							
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	Time to hatch / # hatched											
	Init./Date (1999)	12/h	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are no surviving. P = pupa

Review: Date: 12/21/49
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays3<del>2-42</del> 43-53

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 Sample / Repl. Response 48 43 44 45 46 47 49 50 51 52 53 # Males 12548 D emerged Male Time to Mortality (days) OL Females Time to Mortality (days) Cumulative 1219 number emerged m # Pairings # Egg Case # Eggs / # hatched # Males 12548 E emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / # hatched # Males 12548 F emerged Male Time to Mortality (days) # Females 01 emerged Females 21 14 Time to Mortality (days) Cumulative number emerged 1m wyd Ch # Pairings ٥ الا # Egg Case 1,789 # Eggs / 6 unh 12/19 1 unh. 12/10 Time to hatch / # hatched 17/m 12/5 12/6 12/7 12/11 Init./Date 12/1 1,21/3 12/4 12/8 12/9 (1999)

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_ Date: |\(\overline{\lambda}\lambda \text{l} \(\overline{\lambda}\text{l} \(\overline{\lambda}\text{l} \(\overline{\lambda}\text{g}\)
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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	l B			<del></del>	T				T	T	T	
ample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12548 G	# Males emerged											
	Male Time to Mortality (days)											
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12548 H	# Males emerged	1										
	Male Time to Mortality (days)	80 <sub>13</sub> 19								11		
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<del></del>	Init./Date (1999)	12/1	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9 1m	12/10	12/11
	ring: Record		pae w	nich die	(D) befor	re emer	gence. [	) = dead	for flies		merge b	ut are
viving. P = p nents:	oupa	<del></del>					·					
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Review:	Date:	12/21	199	
Laboratory: Aquatec B	iologica	I Scienc	es, South Burlington, Vermo	nt

ctdays3242 43-530 000031

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12550 A	# Males emerged			1				1				
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	emerged											
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	Time to Mortality	1			ļ.				1	}	1	1
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	number	ļ	1	1	Í	1	į			1	1	1
	emerged				<del> </del>	<del> </del>	<del> </del>	<del> </del>	<b>}</b>	<del> </del>	<del></del>	<del> </del>
	# Pairings											
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	Time to hatch /	Ì	}	1		1	<b>\</b>		[			
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12550 B	emerged											
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	Females		+	+	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Time to Mortality		j	1	j		j	j	{	j	}	}
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	Cumulative number		]	1		1	1		Į.	1	1	
	emerged		<del></del>	<u> </u>	<del> </del>	<u> </u>	ļ	ļ	ļ	<u> </u>	<u> </u>	<del> </del>
	# Pairings											
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	Time to hatch /		į.	j	}	}	}	}	ļ	į	j	İ
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12550 C	# Males			}	1			}				}
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	Time to Mortality (days)		1	}							}	
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	# Egg Case					}						
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	Time to hatch / # hatched					<u> </u>					1	
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	(1999)			1	1	1	1	1	1	1	1	1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/21/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12550 D	# Males emerged				<del> </del>							
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	# Females emerged								İ			
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	Females											
	Time to Mortality (days)		1		1		1		1			ŀ
	Cumulative	<del></del>		<del> </del>	+	┼	<del> </del>	<del> </del>	<del> </del>		<del> </del>	<del> </del>
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	emerged	<b> </b>	<del>- </del>	┦	<del> </del>	<b>↓</b>	↓	<del> </del>	<b>└</b>	ļ	<del> </del>	↓
	# Pairings					-						
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12550 E	# Males emerged											
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	(days)		<del></del>	<u> </u>	ļ	ļ	<del> </del>	ļ	<u> </u>	<u> </u>	<del> </del>	<u> </u>
	# Females emerged								}			
	Females		<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	+	<del> </del>	<del> </del>	<del> </del> -	<del> </del>
	Time to Mortality		1	1	ļ	1	}	1	ļ		]	ļ
	(days)			<del> </del>	ļ	<u> </u>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Cumulative number	•				1	{	1		-	Į.	1
	emerged		L	<u> </u>	l			<u> </u>			<u> </u>	<u> </u>
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	# hatched			<u> </u>		ļ	<u> </u>				<u> </u>	
12550 F	# Maies emerged			}								
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	emerged			1				1		ļ	ļ	
	Females Time to Mortality	— <u>——</u>		<u> </u>				<del>                                     </del>	<del> </del>			
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	Cumulative		1							]		
	number emerged			1		1			1		1	1
	# Pairings											
	# Egg Case		<del> </del> -			<del>                                     </del>	<del> </del>	-	<del> </del>		<del> </del>	
	+ ⊏ûû ∪ase		}									
	# Eggs /		T	1	1	<b>†</b>	1	1		<del>                                     </del>	<del> </del>	1
	Time to hatch / # hatched											
	Init./Date	11/9	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are no' surviving. P = pupa

		, 1	^ -		
Review:	Date:	12/21/	99		
Laboratory:	 -	, .	. ,	Burlington.	Vermont

·												
Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12550 G	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged							-		1		
	Females Time to Mortality (days)						64/20			***		
	Cumulative number emerged									0	1	
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched						†					
12550 H	# Males emerged											
	Male Time to Mortality (days)		1									
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched		<del> </del>			<u> </u>			<del> </del>			<del>                                     </del>
	Init./Date (1999)	11/9	11/10	11/11	11/12	11/13	1,1114	11/15	11/16	11/17	11/18	11/19
nergence scor viving. P = p nents:	ing: Record	d any p	upae wh	ich die (	D) befor	e emerg	ence. D	= dead	for flies	which er	nerge bu	ıt are ı
								<del></del>				
											·	

Review: Date: 12/21/94
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/20/99

Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12550 A	# Males emerged										-	
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)										OL	
	Cumulative number emerged										OP	
	# Parnngs										11137	
	# Egg Case	-										
_	# Eggs / Time to hatch / # hatched											
12550 B	# Maies emerged											
	Male Time to Moriality (days)											
	# Females emerged										OL	
	Females Time to Monality (days)										OP	
	Cumulative number emerged										11/29	
	# Pairings											
	# Egg Case											}
	# Eggs / Time to hatch / # hatched											
12550 C	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged										OL	
	Females Time to Mortality (days)										OP	
	Cumulative numbe: emerged										11/29	
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched		<u> </u>					<u> </u>				
		11/20	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa (300)

Review: \_\_\_\_\_ Date: 12/21/49
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

BTR: 3615 / 3622 Project: 99033 M-C Dead Creek Test Start: 10/19/99

Sample / Repl.	Response	35	<b>22</b> 733	23	24	25	<b>26</b>	378	<b>28</b>	<del>29</del> 40	<del>30</del> 41	<del>31</del>
12550 D	# Males emerged				-	1						
	Male Time to		<del> </del>	<del> </del>		<del> </del>		<del> </del>				
	Mortality								1	ł	İ	
	(days)		<u> </u>		ļ	ļ		ļ		ļ	ļ	
	# Females emerged									ļ	OL	
	Females Time to Mortality					<del>                                     </del>					<del>                                     </del>	
	(days)  Cumulative				ļ		ļ				OP	
	number						1				1/29	
	emerged	_						ļ	ļ		uthi	
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12550 E	# Males emerged											
	Male Time to Mortality	<del></del>										
	(days) # Females	<del></del>	<u> </u>	<del> </del>	-			<del> </del>		<del> </del>	<del>                                     </del>	
	emerged				]		]			]	OL	
	Females								<del> </del>	<del> </del>	1	
	Time to Mortality									ŀ	OP	
	(days)				-			ļ			<del></del>	
	Cumulative number		İ					ì		}	11/29	
	emerged										17-1	-
	# Pairings											
	# Egg Case		_									
	# Eggs /		_	<del>-</del>	<del> </del>	<del> </del>		<del> </del>	-		<del> </del>	
	Time to hatch /					l						1
	# halched			ļ					<u> </u>			
12550 F	# Males emerged									}		
	Male Time to Mortality											
	(days)											
	# Females emerged										01	
	Esmale-						<del></del>		1	<del> </del>	<u> </u>	<del> </del>
	Females Time to Mortality (days)										OP	
	Cumulative		-	<del> </del>	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>	11159	<del>                                     </del>
	number emerged					ļ.					1126	1
				1								1
	# Pairings	<u>.</u>		ļ							ļ	
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
		11/20	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30
			· ··-·		111120	1 1/2		1 1120	1 1121	, ,,,,	11120	1 1100

BTR: 3615 / 3622 Test Start: 10/19/99 Project: 99033 M-C Dead Creek Sample / Repl. Response 26 # Males 12550 G emerged Male Time to Mortality (days) OL emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12550 H emerged Male Time to Mortality (days) # Females OP emerged Females Time to Mortality (days) number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched 11/21 /m Init./Date | 11/20 11/22 11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30 (1999)Emergence scoring: Record any purae which die (D) before emergence. D = dead for flies which emerge but are not L=121-12 surviving. P = pupa Comments: Test day corrector Julgo /59

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12551 A	# Males emerged				1							
	Male Time to				41 4.	,				†	T	
	Mortality (days)		1		50,117	1	ĺ	ĺ	Ì	ĺ	ĺ	
	# Females		<del> </del>	<del> </del>		4 1		<del> </del>	<u> </u>	<del> </del>	<del> </del>	<del>                                     </del>
	emerged					1 1					1	
	Females		†	1	<del> </del>	nt od					<del>                                     </del>	<u> </u>
	Time to Mortality (days)	İ				AL 2d						
	Cumulative			+	+				<del>                                     </del>	<del> </del> -	<del> </del>	
	number					113					1	
	emerged	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>	<del>                                     </del>	<del> </del>	ļ	<del> </del>	<del> </del>
	# Pairings					1/551						
	# Egg Case						ا ا <sup>°</sup> و ا ار 254	(				
	# Eggs /				1		12 unhate	ied				
	Time to hatch / # hatched			1			12 unhate 100% 11/21					ļ
12551 B	# Males emerged						.,,,,					
	Male Time to		-	<del>                                     </del>	<del>                                     </del>						<del>                                     </del>	
	Mortality (days)						}				Į.	
	# Females		<del> </del>	<u> </u>			<u> </u>				<del> </del> -	<del></del>
	emerged											
	Females							<del></del>	<del>                                     </del>	<del> </del>	<del>                                     </del>	
	Time to Mortality			1					ļ		ì	1
	(days) Cumulative		<del>                                     </del>	-	<del> </del>	ļ		<del></del>	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>
	number		}	}	1				l			
	emerged		ļ	<u> </u>	<u> </u>					<del> </del>	<del> </del>	
	# Pairings							ļ				
	# Egg Case											
	# Eggs /		<del>                                     </del>						<del>                                     </del>	<del> </del> -	<del> </del>	<del> </del>
	Time to hatch / # hatched				ļ							}
40554.0	# Males				<del></del>							-
12551 C	emerged											
	Male Time to				<del> </del>				<del> </del>		<del>                                     </del>	
	Mortality			]				]	}	}	ļ	
	(days) # Females		<del>                                     </del>		<del> </del>		<del></del>	<del> </del>		<del> </del>	<del></del>	
	emerged										l	
	Females		<del>                                     </del>	<del> </del>	ļ			<del></del>				
	Time to Mortality		ļ	]	ļ	Į	ļ	Į		j -	1	
	(days) Cumulative			ļ	ļ	<del> </del>			<del> </del>	<del> </del>	<del>                                     </del>	ļ
	number			1					<u> </u>	1	1	ł
	emerged			<u> </u>	<u> </u>	ļ		<u> </u>	<u> </u>	<u> </u>	<del></del>	ļ
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch /		<del>                                     </del>	<del>                                     </del>	<del> </del>	<del>  -</del> -			<del>                                     </del>		<del> </del>	
	# hatched				<u> </u>	]	<u></u>		<u></u>	<u> </u>		
	Init./Date	11/9	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17 -1/17	11/18	11/19
	(1999)	1 5	1	1		147	I. 'Y'	ノグバ	1	1 1/2	1	10

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date: 12/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12551 D	# Maies emerged											
	Male Time to Mortality		<del> </del>		<del>                                     </del>			<del> </del>				
	(days)	ļ	<del> </del>	<del> </del>	<del> </del>		ļ	<u> </u>	<b>!</b>			ļ
	# Females emerged				1			ļ				
	Females Time to Mortality						<del>                                     </del>					
	(days) Cumulative	<del> </del>	<del> </del> -	<del> </del> -	<del> </del>	<del> </del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del> -	<del> </del>	<del> </del>
	riumber emerged								<u> </u>	<u> </u>		
	# Pairings										(	
	# Egg Case											
	# Eggs / Time to hatch /			<del> </del>	<del>                                     </del>	<u> </u>				<del>                                     </del>		
12551 E	# hatched # Males emerged							<u> </u>				<u> </u>
	Male Time to	<u> </u>			<del> </del>	ļ	<del> </del>	}		<u> </u>	<del> </del>	· نــــــــــــــــــــــــــــــــــــ
	Mortainy (days)	<u> </u>	<b></b>	<u> </u>	ļ		<u> </u>		<b></b>	<b></b>	<u></u>	
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged				<del>                                     </del>							
	# Pairings											
	# Egg Case									}		
	# Eggs / Time to hatch / # hatched											
12551 F	# Males emerged											
	Male Time to Mortality				<del> </del>							
	(days) # Females emerged		<u> </u>		<del> </del> -	<del> </del>						-
	Females Time to Mortality		<del> </del>		<del> </del>			<del> </del>		<u> </u>		<del> </del>
	(days) Cumulative number		<del> </del>				-	-			<del> </del>	<del>                                     </del>
	emerged		<del> </del>		1	ļ		-	-	<del> </del>		
	# Pairings				ļ							<u> </u>
	# Egg Case	1										
	# Eggs / Time to hatch /							<del> </del>		<del> </del>		-
	# hatched Init./Date	11/9	11/10	11/11	11/12	111/12	11/14	11/15	11/16	11/17	11/18	11/19
	(1999)	11/9	11/10	11/11	111/12	11/13	11/14	11/15	111/10	11/17	11110	11113

Emergence scoring: Record any pupae which die (C) before emergence. D = dead for flies which emerge but are no' surviving. P = pupa

Review:	Date: 12/21/99	
Laboratory: Aquatec E	iological Sciences, South Burlington, Vermo	nt

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12551 G	# Males emerged	<del>                                     </del>	+		<del>-  </del>	المعنة		111	1	1		
	Male Time to Mortality	<del> </del>	+			-		1 52 5d	40-	6d 11/23	<del> </del>	<del> </del>
	(days) # Females emerged			<del> </del>	<del> </del>	<del> </del>		40 "	4/3/	1423	1,	<del> </del>
	Females Time to Mortality		-	+		+	<del>                                     </del>	]		-	20/20	ļ
	(days) Cumulative number emerged							4	5	6	7	
	# Pairings										WISSIG	}
	# Egg Case											11°2,0
	# Eggs / Time to hatch / # hatched											2-3171 2-200
12551 H	# Males emerged											
	Male Time to Mortality (days) # Females											
	emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings								!			
	# Egg Case										1	
	# Eggs / Time to hatch / # hatched			<del>                  _     _</del>					,			
	Init./Date (1999)	11/9	11/10	11/11	11/12	11/13	11/14	11/15	11/16	些	3/18	11/18
nergence sco rviving. P = p	ring: Recor upa	d any p	upae wh	ich die (	D) befor							
ments:												
			<del></del>			. <del></del>						

Review: Date: 12/2/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/20/99

Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12551 A	# Males emerged				-						-	
	L			<u> </u>			<u> </u>			<u> </u>	<u> </u>	
	Male Time to Mortality							[				[
	(days)		]	}	}	1	}	1	}	)	Ì	1
	# Females			1								
	emerged		1	}	1	1	1		ļ		111	]
	Females			<del> </del>	<del> </del>	<del> </del>	<del> </del>				0	
	Time to Mortality	ı		j	1		Ì	ł	}	}	O	}
	(days) Cumulative			<del> </del>	<del> </del>	<del> </del>		<del> </del>		<del> </del>	11/19	<del> </del>
	number		3			{		[	ĺ	ĺ		
	emerged		<del> </del> _	<del> </del>	ļ	ļ		ļ	ļ		700	ļ
	# Pairings			}			}	}	}			
	# Egg Case											
	# Eggs /		<del> </del>		<del> </del>	<del> </del>		<u> </u>	ļ		<del> </del>	ļ
	Time to hatch /			1		Ì	[	{	{	(		[
	# hatched		<u> </u>	<u> </u>	<u> </u>			ļ				
12551 B	# Males emerged										ł	
	Male Time to		<del> </del>	-	<del> </del>		<del> </del>	<del> </del>	<del>                                     </del>		<del> </del>	
•	Mortality					! 			1			{
	(days)_ # Females		ļ	<del> </del>	<del>}</del>		ļ	<del> </del>	<del> </del>	<del> </del> -	<del> </del> -	<del>}</del>
	emerged							ľ		1	OL	ļ
	Females		<del> </del> -	<u> </u>	<del> </del>	<del></del>	<del> </del> -		ļ	<del></del>	00	<u> </u>
	Time to Monality		}	}		<b>[</b>	ļ	[	[		OP	}
	(days)		<u> </u>		ļ							ļ
	Cumulative number		1	}		ļ	ļ	1	ļ	[	11/29	1
	emerged		<u> </u>					<u> </u>		<u> </u>	11/29	
	# Pairings					-						
	# Egg Case											
	<del> </del>		<b> </b>	ļ	<u> </u>	<u> </u>		<u> </u>	ļ	<u> </u>		<u> </u>
	# Eggs / Time to hatch /		1 			ĺ	ĺ	ĺ	ł	ĺ	ĺ	ĺ
	# hatched				ļ		j				<u> </u>	
12551 C	# Males											
120010	emerged		ł	Ì	l	}	ì	}	l	}	1	ł
	Male Time to				<u> </u>				<u> </u>			
	Mortality (days)		,	<u> </u>		{	1		İ	1	ļ	İ
	# Females		<del> </del>	<del></del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del>                                     </del>
	emerged		ļ	}	Ì	]	)		}	}	OL	}
	Females			<del></del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del> -	<del> </del>		<del> </del>
	Time to Mortality			1	ļ		İ	ļ	ļ	1	OF	1
	(days) Cumulative		<del> </del>	<b> </b>	<del> </del>	<del></del>	ļ	<del> </del>	<del> </del>	<del> </del>	<del></del>	<del> </del> -
	number		Į	ļ		}	}	}	}	,	11/29	<b>[</b>
	emerged		L	<u> </u>		ļ	<u> </u>				177	<b> </b>
	# Pairings								i			
	# Egg Case											
				<u> </u>	L					<u> </u>		<u> </u>
	# Eggs / Time to hatch /			{								
	# hatched		1									
	# hatched Init./Date	11/20	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa  $\angle = \sqrt{3110}$ 

Review: \_\_\_\_\_ Date: 12/21/49
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

ample / Repl.	Response	232	22	23-	35	25	<b>26</b> 37	38	28	29	- <del>30</del> +1	-34 42
12551 D	# Males emerged											
	Male Time to		<del> </del>	<del> </del>	<del> </del>	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	├	<del> </del>
	Mortality			[	[	1	1	(	ĺ	ĺ	ľ	
	(days)			ļ		<u> </u>	ļ				<u> </u>	<u> </u>
	# Females emerged			1	[	ļ	}	j	]	1	ſ	Í
							l	l	l	l		
	Females							T			~ .	
	Time to Mortality					1	ļ	1	}	1	101.	}
	(days) Cumulative			<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del> -		120	
	number					Ĭ	ĺ	l		ļ	(C){	
	emerged			<del> </del>	ļ	ļ		<b>├</b> ──			<u> </u>	
	# Pairings						Ì	1	ļ	İ	11/29	<u> </u>
	# 1 GHINGS					ļ		<u> </u>	ļ		11/29 Tm	
	# Egg Case				1							
	# Eggs /			<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	
	Time to hatch /											
	# hatched			<del> </del>			-	<del> </del>	<u> </u>			
12551 E	# Maies emerged			1			-					
	Male Time to											
	Mortality (days)							Ì	İ	ĺ	İ	
	# Females					<del></del>	<del></del>	<del></del>	<del></del>	<del></del>	211	
	emerged	j		]				]	]	)	UL-	
	Females			<del> </del>		<u> </u>		<del> </del>			100	
	Time to Mortality						İ		<b>\</b>	ļ	101	l
	(days)					<u> </u>		<u> </u>			1.1.	
	Cumulative										111124_	
	number	İ		1		}			]	ļ	133	
	# Pairings											
	# Egg Case											
	# Eggs /					<u> </u>			<u> </u>			
	Time to hatch /					[		1	j			į
	# hatched			ļ				<del> </del>				
12551 F	# Maies emerged			}		}		ļ		1		
									1	<u> </u>	<u></u>	
	Male Time to							1		İ	0.7	
	Mortality (days)	1		1		Į		1	l		106	}
	# Females										T	
	emerged						Į.		]		OP	ł
	Females			<del> </del>	<del></del>	<del> </del>	<del> </del>	<del>}</del>	<del> </del>	<del> </del>	<del>1</del>	<del> </del>
	Time to Mortality	}					1	1	1		11/29/	
	(days)					<u> </u>	<u> </u>	1	<u> </u>	ļ		Ľ
	Cumulative number	1		(				1	}			
	emerged							1				Ì
				<u> </u>		- · · · · ·					T	
	# Pairings						ļ	-			-	<del> </del>
	# Egg Case								}			
	# Eggs /			<del> </del>		<del> </del>	-	<del> </del>		<del> </del>	<del> </del>	
	Time to hatch /	}		j	l	j	1	ì	}	1	i	1
	# hatched			1	1	1	ĺ			1	1	
<del></del> _	# hatched	11/20	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa (= | 34-y a

Review: Date: 144/96
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Sample / Repl.	Response	32	22/33	25 74	24	25	35	238	38	<del>29</del>	- <del>30</del>	<del>31</del> <del>4</del> 2
12551 G	# Males emerged	1.32	33	1 2 7	23	1 00	1 2 /	1 70	3/	70	77	72
	Male Time to Mortality (days)		\									
	# Females emerged							1			100	
	Females Time to Mortality (days)		Ţ								OP	
	Cumulative number emerged		7								11/294	
	# Pairings											
	# Egg Case					<u>!</u>						
	# Eggs / Time to hatch / # hatched											
12551 H	≓ Males emerged											
	Male Time to Mortality (days)											
	# Females emerged										OL	
	Females Time to Mortality (days)										OP	
	Cumulative number emerged										11/2/2	5
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/20	11/21 1/M	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30
nergence sco viving. P = p	ring: Record	any pu	ipae whi	ich die (l	D) before	e emerge	ence. D	= dead	for flies	which er	nerge bi	ut are n
ments:											<del></del>	
	O Tes	5 di	2y C	orrec	nan		11/	24/9	7			
		<del></del>										
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Review: Date: 12/2/ /99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12552 A	# Males emerged			2[17]		1 crushed			1	<del></del>		
	Male Time to Mortality		5415	606d		00/1/13			74/13			
	(days) # Females		1-111.	1111111111111111	<del>}</del>	<u> </u>	<del> </del>	<del>  .</del>	765		<del> </del>	
	emerged										1.	
	Females Time to Mortality (days)						Wecode	ADNA	-		ACTIP	-
	Cumulative number		i i	3		14		(-	7		8	
	emerged	_		<del></del>	ļ	1 1		6			<del></del>	
	# Pairings	<del>-</del>					W/552E	W/552F			WSE TIE	
	# Egg Case						}		! 		(1/2) IM	
	# Eggs / Time to hatch / # hatched											
12552 B	# Maies emerged		2(ii)		1.							
	Male Time to		6d 6d		,							
	Mortality (days)		אווי מונוי		600,118		{	[	[ [			
	# Females emerged	-	3,			Al IB				<del></del>	1	
	Females		1			21 1	[	<del></del>			1.	
	Time to Mortality (days)					31 12	k				40,130	
	Cumulative		1			/ 11	·		80tml		1 ~	
	number emerged		2			V7 13	X170		80 m/ >552c€		6	
	emargeo		-~-			111/-28	6	<del></del> -	11/12		<del></del>	
	# Pairings					W/5524		<u> </u>	,,-		NEEDE	
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12552 C	# Males emerged				1	1 1						
	Male Time to Mortality (days)				Odales	3d 3d						
	# Females emerged				 	11/10 11/11						
	Females Time to Mortality				<del></del>					<del></del>		
	(days) Cumulative		<del>  </del>			<del> </del>	ļ	<u> </u>	<del>                                     </del>		<del> </del>	
	number emerged					3						
	# Pairings									<u> </u>		
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/9	11/10	13/11	1442	11/13	11/14	17/15	11/16	11/17	11/18	11//12

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 121/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek Test Start: 10/19/99 BTR: 3615 / 3622 Sample / Repl. Response 22 23 30 21 24 25 26 27 28 29 31 12552 D emerged Male Time to 80/19 50,118 Mortality (days) # Females emerged 14 Time to Mortality 11/1 (days) Cumulative number emerged # Pairings 10 Est. # Egg Case ~12 unlythed 5 miles hed # Eggs / Time to hatch / 11/19 60% # hatched # Males OM. 12552 E emerged Male Time to dolla 50,10 Mortality (days) # Females emerged lid" 15 Females 3,40 Time to Mortality (days) Cumulative number 10 emerged W/5526 # Pairings # Egg Case # Eggs / Time to hatch / # hatched 12552 F 11/30 Male Time to नाम स्टे Mortality (days) # Females Females 90 Time to Mortality (days) Cumulative 2 number emerged WSTLA 1 # Pairings 1/1160 470 # Egg Case I ami! 121312 100% Tunhatched 1/24 # Eggs / Time to hatch / 1421 # hatched 11/10 12/11 1,1/12 Init./Date 11/9 11/16 11/17 (1999)Emergence scoring: Record any pupa'e which die (D) before emergence. D = dead for flies which emerge but are not

surviving. P = pupa

Review: \_\_\_\_\_ Date: / \( \bar{\mu} \) \( \bar{

Ocorrection 5

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Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12552 G	# Males emerged		10	2(1)					1.	1		
	Male Time to	<del> </del>			<del> </del>	<del>                                     </del>	<del>                                     </del>	†	111	70	<del> </del>	+
	Mortality (days)		01/	51 6	Ha .			ļ	4420	6d 11/23	}	
	# Females	+	<del> </del>	14/10 21	h-1	<del> </del>	+	<del> </del>	1-00	11/42	<del> </del>	+
	emerged	1					1 1.			1 '	1	
	Females	<del> </del>		<del></del>	<del> </del>	<del></del>	1/5-12	<del> </del>	+	<del></del>	+	┼
	Time to Mortality	1			1		49 19	d	}		1	
	(days) Cumulative	<del> </del>	_}	<del></del>	<del>}</del>	<del></del>	11/18 11/1	<del></del>	<del> </del>	<del></del>	<del> </del>	<del> </del>
	unuper	1		3		}	15		G	1	[	
	emerged	<u> </u>		12			WU_	<u> </u>	10	14	1	<u> </u>
	# Pairings						W/552 183			'		
	# Egg Case	<del> </del>					THE	510		<del></del>	† <del></del>	
	•	ļ		1	)			902	1.		Ì	1
	# Eggs /	<del></del>	<del> </del>	<del> </del>	<del> </del>	+	+		JOHN STATE	<del> </del>	<del></del> -	<del> </del>
	Time to hatch / # hatched	ļ	ĺ				1	202110	atched	.1124	1	
4055011	# Males	<del> </del>	<del></del>	+	<del> </del>		<del></del>	902 WI	arcoun	+	<del> </del>	
12552 H	ernerged			<u> </u>						ļ		
	Male Time to Mortality (days)	1						ļ		}		
	# Females emerged			1								1
	Females Time to Mortality (days)		<del>-  </del>	Sdille			1	<del> </del>				13,
	Cumulative number		<del> </del>				1	†	<del> </del>		<del>                                     </del>	13
	# Pairings		<del>                                     </del>	1 W 552 6 A		<del> </del>	+	<del> </del> -	<del> </del>	<del> </del>	<del>                                     </del>	1/2
				225 G.W	-	-	10	-	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	# Egg Case		_		1		1,508					
	# Eggs /			1			0% 42	tda				
	Time to hatch / # hatched	}	1		l	1	0% has	1	1		1	}
	Init./Date	11/9	13/10	1444	11/12	11/13	11/14	11/15	13/18	1117	11/18	1944
	(1999)	<u> </u>	1 NV	1 1/11		<u> </u>	トノブ	1710	1 // / /		1	100
nergence sco	ring: Recor	d any p	oupae wh	ich die ([	D) befor	e emerg	ence. D	= dead	for flies	which er	nerge bi	ut are
rviving. $P = p$	upa											
ments:												
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Review: \_\_\_\_\_\_ Date: 12/21/69
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Test Start: 10/20/99 Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Sample / Repl. Response 32 33 42 34 35 36 37 38 39 40 41 # Males 12552 A emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative 8 number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12552 B emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number (e emerged # Pairings # Egg Case D 516 0% hatch # Eggs / Time to hatch / # hatched # Males Ozhatch 11128

12552 C emerged Male Time to 90125 Monality (days) emerged Females Time to Mortality (days) Cumulative number emerged # Egg Case

Emergence scoring: Record any purpae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

11/24

11/25

11/23

11/22

11/26 11/27

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Review:		Date:	12/	21/	90	ĵ			
Laboratory: A	Aquatec B	iologica	l Sci	ienò	es,	South	Burlingt	on, ۱	/ermont

Time to hatch / # hatched

(1999)

Init./Date |11/20

ctdays32-42

11/30

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

### 12552 D ####################################	Sample / Repl.	Response	232	237	23-	35	256	35	琴8	-28-	29 40	30-	34
Mortally (days)   Emped	12552 D												
Mortally (days)   Emped		Maie Time to	<del> </del>	ļ	┼──	<del> </del>	<del> </del>		<del> </del>		<del> </del> -		<del> </del>
Clays    Females   Femal			1	1	}	}	ł	}	Ì	ł	}	}	{
### ##################################		(days)		<u> </u>	<u> </u>	<u> </u>					L	l	
The following state of the stat													
Time to Mortality (Glays)  Cuminality emerged  # Egg Case  # Egg Case  # Egg Case    Females   Females     Fem		emerged	1	}								1	l
Comulative		Females		<del> </del> /del>	<del> </del>	<del>                                     </del>				<del></del>			
Cumulative			1			ļ			İ			į.	
# Egg Case  # Egg Case  # Egg A Time to harch / # Antiched # Antic				<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del>                                     </del>	<del> </del>	-
# Parings  # Egg ase  # Eggs / Time to hater / # hatchard    Male Time to hater / # hatchard   Male Time to Mortally (1099)   # ameriged   Time to Mortally (1099)   # ameriged   Time to Mortally (1099)   # Parings   # Egg Case   Time to Mortally (1099)   # Egg Case   Time to Mortally (1099)   # Egg Case   Time to Mortally (1099)   # Egg Case   Time to Mortally (1099)   # Familias     # Male Time to Mortally (1099)   # Familias     Familias     Time to Mortally (1099)   # Familias     Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1099)   Time to Mortally (1				5		1		1				1	
# Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # # Male Time to Mortality    # Egg Case		emerged		J		<u> </u>	<u> </u>		<u> </u>				
# Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # Eggs / # # Male Time to Mortality    # Egg Case		# Deining						]	}		1		İ
# Eggs / Time to harbrid # # # # # # # # # # # # # # # # # # #		# Pairings									ļ		
Time to ratch / # hatched		# Egg Case											
Time to hatch / # hatched   # hatched		# Eggs /	<del></del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del> -	<del>                                     </del>	<del> </del>
12552 E  # Males		Time to hatch /									1		
Male Time to Mortality (days)  # Females Time to Mortality (days)  Cumulative number emerged  # Egg Case  # Egg Case  # Egg S/ Time to hatch / # hatched  Male Time to Mortality (days)  # Egg Case  # Egg Case  # Eggs / Time to hatch / # hatched  Male Time to Mortality (days)  # Females emerged  Females Time to Mortality Cumulative number emerged  # Parings  # Egg Case  # Egg Case							<u> </u>	<u> </u>		<del> </del>		<u> </u>	<u> </u>
Mortality (days) # Females Time to Mortality (days) Cumulative number emerged # Pairings  # Egg Case  # Egg Ase    Males Time to Mortality (days) # Females # Emales emerged   Males Time to Mortality (days) # Females   Females   Females   Females   Females   Time to Mortality   Cumulative	12552 E			}									
Mortality (days) # Females Time to Mortality (days) Cumulative number emerged # Pairings  # Egg Case  # Egg Ase    Males Time to Mortality (days) # Females # Emales emerged   Males Time to Mortality (days) # Females   Females   Females   Females   Females   Time to Mortality   Cumulative		Male Time to				<del>├</del> ─	<del> </del>	<u> </u>	<del> </del>	<del> </del>	<del> </del>	<del></del>	<del>                                     </del>
# Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Eggs / # Egg Case  # Eggs / I'me to hatch / # hatched  Males emerged  Males Time to Mortality (days)  # # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  # Egg Case  # Egg Case  # Egg Case  # Egg Case					)				1				
### Eggs / Females   Femal					<u> </u>		<u> </u>	ļ		<b></b>	<u> </u>	ļ	<del> </del>
Time to Monality (days)   Cumulative number emerged   (													
Time to Mortality   (days)   Cumulative   number   emerged   # Eggs / Time to hatch / # halched   # Females   emerged   # Females   # Females   # Females   # Females   Time to Mortality (days)   Cumulative   number   emerged   # Pairings   # Eggs / Time to Mortality (days)   Cumulative   number   emerged   # Pairings   # Egg Case   # Eggs / Time to Matched   # Egg Case   # Egg Case   # Egg Case   # Eggs / Time to hatch / # hatched   # Egg / Eggs / Time to hatch / # hatched   # Eggs / Time to hatch / # hatched   # Eggs / Time to hatch / # hatched   # Egg / Eggs / Time to hatch / # hatched   # Egg / Eggs / E		Females			<del> </del>	1	<del> </del>		<del>                                     </del>	<del> </del>		┼	<del> </del> -
Cumulative number emerged		Time to Mortality		İ									ĺ
Number emerged   Number emerged										<u> </u>		<u> </u>	
# Eggs / Time to hatch / # hatched  12552 F  # Eggs / Time to hatch / # hatched  12552 F  # Male Time to Mortality (days) (days) # Females Time to Mortality (days) Cumulative number emerged # Egg Case  # Egg / Time to hatch / # hatched				10							1		
# Egg Case  # Egg S / Time to hatch / # hatched  12552 F  Male Time to Mortality (days) # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Egg Case  # Egg Case  # Egg Case  # Egg Case  # Egg Case				(O	}				i		1	1	
# Egg Case  # Egg / Time to hatch / # hatched  12552 F # Males emerged  Male Time to Mortality (days) # Females emerged  Females Time to Mortality (days) Cumulative number emerged  # Parrings  # Egg Case  # Egg Case  # Egg Case					<del>                                     </del>	<u> </u>	į – –				1		
# Eggs / Time to hatch / # hatched		# Pairings					<del> </del>	1				-	ļ
Time to hatch		# Egg Case											
Time to hatch		# Eggs /				<del>                                     </del>	<del> </del>	<del>                                     </del>	<del> </del>	<del></del>	<del>                                     </del>	1	<del> </del>
# Egg Case  # Males emerged  Male Time to Mortality (days)  # Females emerged  Time to Mortality (days)  Cumulative number emerged  # Egg Case  # Egg / Time to hatch / # hatched		Time to hatch /				l			1		1		1
Male Time to Mortality (days)  # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg 7 Time to hatch / # hatched					<u> </u>		<u> </u>	<u> </u>			<u> </u>		
Male Time to Mortality (days)  # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg 7 Time to hatch / # hatched	12552 F				ļ								
Mortality (days)  # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg S / Time to hatch / # hatched		emerged			L								
# Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg S / Time to hatch / # hatched		Mortality											
Time to hatch / # hatched		# Females											
number emerged  # Pairings  # Egg Case  # Eggs / Time to hatch / # hatched		Time to Mortality											
# Egg Case  # Eggs / Time to hatch / # hatched						1							1
# Egg Case  # Eggs / Time to hatch / # hatched				10	Į	1		1		1	1	)	}
# Egg Case  # Eggs / Time to hatch / # hatched		emerged			<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del>                                     </del>	<del> </del>	<del> </del>
# Eggs / Time to hatch / # hatched		# Pairings											
Time to hatch / # hatched		# Egg Case											
Time to hatch / # hatched		WE							-	<u> </u>			<u> </u>
# hatched										]			Į.
Init/Date   11/20   11/21   11/22   11/23   11/24   11/25   11/26   11/27   11/28   11/29   11/3		# halched				ł		1	<u> </u>	<u> </u>	1	1	
		Init./Date	11/20	1///1	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

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				10	-11/20/60	
Review:		_ Date:	12/2	1/99		
Laboratory	: Aquatec	_ Biologic	al Scien	ces. Sou	th Burlington, \	/ermo

Test Start: 10/19/99

BTR: 3615 / 3622

Sample / Repl.	Response	3/2	- 22-	234	24	25%	35	27 38	势	29- 40	30	-31/2
12552 G	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged										<del> </del>	
	Females Time to Mortality (days)											
	Cumulative number emerged		7									
	# Pairings											
	# Egg Case							,				
·	# Eggs / Time.to hatch / # hatched											
12552 H	# Males emerged											
	Male Time to Mortality (days)			Other								
	# Females emerged			13								
	Females Time to Mortality (days)			00								
	Cumulative number emerged		2	B						ļ		
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/20	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30
nergence scor	ing: Recor	d any pu		ich die (l		emerg	ence. D	= dead	for flies	which er	nerge bi	ut are not
rviving. P = p ments:	upa		$\frac{\alpha}{\alpha}$	e 10 1	h Irina O	1616	Im III				<del></del>	
			<u> </u>		7119 7	4		22		<del>,</del>		
<del></del>			(2)/	-55 2	By C	correc	Nou		1/30/9	14		
			•••				<del></del>				<del></del>	
			<del></del>		<del></del>							

Review: Date: 12/21/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 Sample / Repl. Response 43 51 44 45 46 47 48 49 50 52 53 # Males 12552 A emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12552 B Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12552 C emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched 12/3 Init./Date 12/1 12/2 12/4 12/5 12/6 12/7 12/8 12/9 12/10 12/11 (1999)

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_\_ Date: | 2/21/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays3<del>2-42</del> 43-53

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12552 D	# Males emerged					<del> </del>						
	Male Time to Mortality (days)			106	-							
	# Females emerged			OP							<del>                                     </del>	
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12552 E	# Males emerged											
	Male Time to Mortality (days)			OL								
	# Females emerged			OP								
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	≠ Egg Case											
	# Éggs / Time to hatch / # hatched						<del> </del>					
12552 F	# Maies emerged											
	Male Time to Mortality (days)			OL								
	# Females emerged			DP								
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
<del></del>		12/1	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date: 121/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays3<del>2-42</del> +3-53

ect: 99033 M	-C Deau Cr	- CCK	БІ	R: 3615	3022			1e	or oran	: 10/19/	J J	
Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12552 G	# Males emerged								1			
	Male Time to Mortality (days)			DL								
	# Females emerged			MP								
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12552 H	# Males emerged											
	Male Time to Mortality (days)			OL								
	# Females emerged			OP								
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	12/1	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/1
nergence sco viving. P = p ments:	ring: Record	d any p	upae wh	nich die (	D) befoi	re emerg	gence. [	) = dead	for flies	which e	merge bi	ut are
									-			
									<del>-</del>			

Review: \_\_\_\_\_ Date. 12/21/29
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

cidays3<del>2-42</del> +73 -5-3

BTR: 3615 / 3622 Test Start: 10/19/99 Project: 99033 M-C Dead Creek Sample / Repl. Response 21 22 23 24 25 26 27 28 29 30 31 # Males 12592 A emerged Male Time to Sd 1/1/24 Mortality (days) # Females emerged Females 14,1/95 30,119 Time to Mortality (days) Cumulative 3 emerged W1592E # Pairings # Egg Case 153 unharched 1175 50 unharched 11726 # Eggs / Time to hatch / # hatched 12592 B Male Time to 3d,115 Mortality (days) # Females ) clead emerged Females 00/1/2 Time to Mortality (days) Cumulative number emerged W126 # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12592 C emerged Male Time to 3d:1115 Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative 3 number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched Init./Date 11/9 11/10 11/11 11/12 11/13 1,1/16 (1999)Emergence scoring: Record any pupae which die (1) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 17/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 Sample / Repl. Response 21 23 24 25 26 27 29 22 28 30 31 VI # Males 12592 D emerged Bead Male Time to 34 04/1/9 Mortality 11/18 (days) # Females emerged Females 13d Time to Mortality (days) Cumulative number emerged ₩/592**E** # Pairings 1G # Egg Case # Eggs / Time to hatch / # hatched # Males 12592 E emerged Male Time to 5d,117 40 718 Mortality (days) # Females emerged Females lad 1115 Ad. Time to Mortality (days) Cumulative emerged 14/5°2C ×159287 # Pairings J11/12 21, €ST. 623 # Egg Case 1,020 6 mhatel ed 1009 181 # Eggs / Time to hatch / is unharched ≠ hatched # Males 12592 F emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched 11/15 11/16 /// 11/10 11/18 Init./Date 11/9 111/11 11/13 (1999) Emergence scoring: Record any pupae which die (. ) before emergence. D dead for flies which emerge but are not su diving. P ≃ pupa 1) Det wire reneribed to new der Sheet (begins addays21-31

Day 32 observenions).

12/22/99000054 Review: \_\_\_\_\_ Date: 12/2/29
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ct: 99033 M	-C Dead Creek   BTR: 3615 / 3622   Test Start: 10/19/99     Response   21   22   23   24   25   26   27   28   29   30   31											
ample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12592 G	# Males emerged		<del>                                     </del>			<del>                                     </del>			1.			1星
	Male Time to Mortality (days)				<del> </del>				30/1/9			30,102
	# Females emerged										1	1
	Females Time to Mortality (days)										30 Jula	1411113 IG
	Cumulative number emerged				1							175
	# Pairings				<u> </u>							1 51/R
	# Egg Case				:							
	# Eggs / Time to hatch / # hatched				i							
2592 H	# Maies emerged										ID	11
	Male Time to Mortality (days)										O'Ila	HU COTALA
	# Females emergeo				i				ł			1
	Females Time to Monality (days)				:				20,118			Dr. recorded
	Cumulative number emerged				:						ļ	14
	# Pairings		<u> </u>		<u> </u>			<u> </u>	عادان عائلا			
	# Egg Case				!							
	# Eggs / Time to hatch / # hatched				<del>!</del>							
	Init./Date (1999)	11/9	11/10	11/11	1/12	11/13	11/14	11/15	1,1/16 ///	11/17	11/18	11/19
ergence scor iving. P = p	ing: Record	d any p	upae wh	ich die (	) before	e emerg	ence. D	= dead	for flies	which ei	merge bu	ut <b>a</b> re no
ents:	<u> </u>									<del>-</del>		
<del></del>							<del></del>					
				··			<del></del>		<del></del>			<u></u>

		12/21/	a.C.	
Review:	Date:	,,,,,,,(	99	
Laboratory: Ar	guatec Biologica	al Sciences	South Burlington	Vermont

Midge (Chironomus tentans) Chronic Toxicity Test Biological Monitoring Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/20/99 Sample / Repl. Response 32 33 34 35 36 37 38 39 40 41 42 # Males 12592 A emerged Male Time to (days) # Females emerged 13.1 60 M/L3 11/26 Females Time to Mortality (days) 15 g Cumulative number 6 M1289ECT emerged 11/20 9 # Pairings HEYS HE # Egg Case # Eggs / Time to hatch / # hatched 76 unhatched 62 unhatched # Males 12592 B emerged Male Time to Mortality (days) # Females D emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12592 C emerged Male Time to Mortality (days) # Females emerged Females 201/27 30,1120 Time to Mortality (days) Cumulative  $\bigcirc$ number emerged 11/3/2 K # Pairings

Init./Date 11/20 11/21 11/22 13/28 11/24 11/25 11/26 11/27 11/28 11/29 11/30 (1999)

Emergence scoring: Record any purae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

# Egg Case

# Eggs / Time to hatch / # hatched

ctdays32-42

700

v30 mh, 12/4

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 278 Sample / Repl. Response # Males 12592 D emerged Male Time to Mortality 30/1/24 (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12592 E 1 emerged Male Time to 40 Mortality 11/29 (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged 川千字 # Pairings # Egg Case # Eggs / Time to hatch / 1,447 1200 Un. 11/27 # hatched # Males - 200 in 11/24 12592 F emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairmos # Egg Case # Eggs / # hatched 11/23 11/22 Init./Date 11/20 11/24 11/25 11/26 11/27 11/28 11/29

Surviving. P = pupa

(I.) Jest Day Correction 1/30/gg

Review: Date: 1/21/90 ctdays32-42

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not

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Sample / Repl.	Response	32	<del>22</del>	23-	24	35	26 37	378	<del>28</del> <del>3</del> 9	29	30-	31
12592 G	# Maies emerged		1			1/		1.			1	
	Male Time to Mortality (days)		70,1/24			9 12/3		30,129			6212/5	
	# Females emerged			1	1.	,.	- '		,			
	Females Time to Mortality (days)			30,175	30/16							
11/19 20 20 1/12	Cumulative number emerged		5	ھا	7	8		9			10	
11/19 20 2 00 111	# Pairings			W5928	4/592 1307							
r	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12592 H	# Males emerged	1 +										
	Male Time to Mortality (days)	54,2556	<del>5</del> -									
	# Females emerged	1		ID								
	Females Time to Mortality (days)	40,1124		Ogmas								
	Cumulative number emerged		5	(o_	<u></u>							
	# Pairings	113891										ļ 
	# Egg Case			10								
	# Eggs / Time to hatch / # hatched			5305m2	riag L							
	Init./Date (1999)	11/20	1/84	11/22 11/N	11/23	14/24 m	1/25	11/25	11/27	11/28 TM	1428	11/30
nergence scor rviving. P = pi ments:	ing: Recor			of die (D	··	emerge					nerge bu	t are
		TeST	Da	y Cu	rre C	DU		11/	30/9	9		
					······································							
					<del></del>							

Review: \_\_\_\_\_ Date: 12/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12592 A	# Males emerged		1		<del>                                     </del>	<del>                                     </del>	1/20	ge L	1,	-	-	
	Male Time to	<del> </del>	<del> </del> -	<del></del>	<del> </del>	<del> </del>	<del></del>	F	<del></del>	<del> </del>	<del> </del>	<del> </del>
	Mortality		1	1	1	ł	IOP	l	-	ļ		}
	(days) # Females			<del></del>		<del> </del>	$\bot \lor \bot \bot$	<b></b> -	<del> </del>	+	<del> </del>	<del> </del>
	emerged			1	}	1	17/656	}				
	Females		1	<del> </del>	<del> </del> -	<del> </del>		1	†	1	<del> </del>	<del> </del>
	Time to Mortality (days)		}	}	ļ	ļ	ļ				1	ļ
	Cumulative		<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>			f
	number emerged	l			1	İ		1	}			1
	# Pairings											
	# Egg Case											
	# Eggs /				<del> </del> -		}		-	<del> </del>	<del> </del>	
	Time to hatch / # hatched											
12592 B	# Males emerged											
	Male Time to Mortality								<b>†</b>			
	(days) # Females		<del> </del>	<del> </del>	ļ	<del></del>	<del> </del>	ļ	<del>- </del>	<del> </del> -	<del> </del>	<del> </del>
	emerged						106	[				
	Females	<del></del>	<del> </del>	<del> </del>	<del> </del>	+	+	<del> </del>	<del> </del>	<del> </del>	+	<del> </del>
	Time to Mortality (days)			ļ			OP		1	1		
	Cumulative	l	<del> </del>	<del></del>	<del> </del>	<del> </del>	12/	<del> </del>	<del></del>	<del>                                     </del>	<del>                                     </del>	
	number emerged						1261C					
	# Pairings											
	# Egg Case											
	# Eggs /		<del> </del>	1-3		<del> </del>	<del> </del>			<del> </del>	<del> </del>	<del> </del>
	Time to hatch / # hatched		1	1				1				ĺ
12592 C	# Males										<u> </u>	
12002 0	emerged							<u> </u>				
	Male Time to Mortality			}			}	}			1	
	(days)					}	}	j	1		1	
	# Females emerged						OL					
			ļ <u>.</u>	ļ	ļ	J	00	ļ	<del> </del>	<u> </u>	<del> </del>	ļ
	Females Time to Mortality	,					108					
	(days)		ļ	<u> </u>			171	<u> </u>	<u> </u>		<b></b>	<u> </u>
	Cumulative number		{	1		}	117/10	<u>_</u>			)	}
	emerged		<u> </u>	<del> </del>	<del></del>	1	17/656		<u> </u>			<b></b>
	# Pairings											
	# Egg Case						1					
	# Eggs /		<del> </del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del>	<del> </del>	+	+		<del> </del> -
	Time to hatch / # hatched											
	Init./Date	12/1	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11
	(1999)		1	1	<u></u>			<u> </u>				

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/21/99
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ctdays3<del>242</del> 43-53

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Mais Trate to (1,0%)   Females   F	Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
Morally (1974)   F Final (1974)   F Fi	12592 D								-				
Comparison					<del> </del>	<del> </del> -	<del> </del>	<del> </del>			<del> </del>	<del> </del>	<del> </del>
# # Families   Families				}	Ì	}		}		1	1		
Temporal   Time to Manager			<del> </del>	<del> </del> -	<del> </del>	<del>                                     </del>	<del>                                     </del>	\mathrew{\gamma}\lambda		<del> </del>		1	
Time to Mortality (Gays)  Fegg Case  # Egg Case  # Egg Case  # Egg Case    # Egg Case		emerged						06					Ì
Commission   Com		Females			1		†	NP.				<del></del>	
Curusalive		(days)	1	1			1	$\mathcal{O}^{T}$			1		}
# Egg Case # Egg Case # Egg Case # Egg Case # Relief		Cumulative					1	2/					
# Eggs / Time to hatch / # hatched # # Eggs / Time to hatch / # hatched # # # # # # # # # # # # # # # # # # #								1161G	/		1		
# Eggs / Trime to Ination		# Pairings											
Time to hatch		# Egg Case											
Time to hatch					<u> </u>								
# hatched # Males emerged # # # # # # # # # # # # # # # # # # #													
Maie Time to   Mortality				l		]		ł ;					ļ
Mortality (days)   Females	12592 E												
(days)  # Females emerged    C   C				<del>                                     </del>	<del> </del>	<del> </del>	1			<del> </del>	<del> </del>	<del> </del>	
# Females   Females   Females		Mortality (days)			1		1			ļ			}
Females Time to Montality (days) Curunidative number emerged  # Parings  # Eggs / Time to halch / # hatched  # Males emerged  Make Time to Montality (days)  # Females females females firme to Montality (days)  # Females firme to Montality Curunidative number emerged  # Parings  # Egg Case  # Egg Case    12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/11     10/11/11/11/11/11/11/11/11/11/11/11/11/1		# Females		<del></del>	<del> </del>	<del> </del>	<del> </del>	<del>  </del>		<del>                                     </del>	<del> </del>	<del> </del>	† <i>-</i> -
Time to Mortality (glays)   Cumulative number emerged   12/2/25   12/6   12/7   12/8   12/9   12/10   12/11		emerged						$\bigcirc$				1	
Comulative number emerged   12/136   12/156				<del> </del>	<del> </del>	<del> </del>		100		<del> </del>	<del>                                     </del>	<del> </del>	<del> </del>
Comulative number emerged   12/136   12/156					ĺ			10Y 1			-		
# Egg Case  # Egg Case  # Egg Case  # Egg Case  # Males emerged  Male Time to Notarily (days)  # Females Emerged  # Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case    12/6/6/6				<del> </del>	<del>                                     </del>		<del>                                     </del>	·			<del> </del>	<del> </del>	
# Egg Case  # Egg Case  # Eggs / Time to halch / # hatched  # Males merged  Male Time to Mortality (days)  # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  # Egg Case    # Egg Case   #								1961	•		1		
# Eggs / Time to hatch / # hatched # Females		emerged		<del> </del>		<del> </del> -	<del> </del>	1 1000		<del> </del>	<del> </del>	<del> </del>	<del> </del> -
# Eggs / Time to halch / # hatched  12592 F # Males emerged  Male Time to Mortality (days)  # Females Time to Mortality (days)  Cumulative rumber emerged  # Patrings  # Egg Case  # Egg Case  # Init / Date   12/1   12/2   12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/10		# Pairings									<u> </u>		
Time to hatch / # hatched   # Males emerged		# Egg Case											
# hatched # Males emerged  Male Time to Mortality (days)  # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  # Egg S / Time to hatch / # hatched  Init./Date 12/1 12/2 12/3 12/4 12/5 12/6 12/7 12/8 12/9 12/10 12/1		# Eggs /				<del> </del>	<del>                                     </del>	<del> </del> -			<del> </del>	<del> </del>	<b></b>
Make Time to   Mortality (days)   # Females						}			i				
Male Time to Montality (days) # Females emerged  Females Time to Montality (days) Cumulative number emerged # Pairings  # Eggs / Time to hatch / # hatched  Init./Date 12/1 12/2 12/3 12/4 12/5 12/6 12/7 12/8 12/9 12/10 12/1	12502 E				<del> </del>	<del></del>		i i		<del>                                     </del>		<del> </del>	<u> </u>
Mortality (days)	12332 1	emerged											-
# Females emerged						i	1				1		<b>†</b>
# Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  Init./Date 12/1 12/2 12/3 12/4 12/5 12/6 12/7 12/8 12/9 12/10 12/1-		(days)											
Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case    # Eggs / Time to hatch / # hatched   12/1   12/2   12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/11		# Females						101					
Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case    # Eggs / Time to hatch / # hatched   12/1   12/2   12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/11		Females		<del> </del>	<del> </del>	<del> </del>	<del> </del>	100		<del> </del>	<del> </del>	<del> </del>	<del> </del>
# Egg Case # Egg S / Time to hatch / # hatched   12/1   12/2   12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/11		Time to Mortality				1		IUK					
# Egg Case  # Egg s / Time to hatch / # hatched  Init./Date   12/1   12/2   12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/1				<del> </del>		<del> </del>	<del> </del>	+		<del> </del>	<del> </del>	<del> </del>	<del> </del>
# Eggs / Time to hatch / # hatched Init./Date 12/1 12/2 12/3 12/4 12/5 12/6 12/7 12/8 12/9 12/10 12/10		number		1	1	1		146-16	L	1	1	1	1
# Egg Case  # Eggs / Time to hatch / # hatched  Init./Date   12/1   12/2   12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/1		emerged		<del></del>		<del> </del>	1	1.0g		<del> </del>	<del> </del>	<del> </del>	<del> </del> -
# Eggs / Time to hatch / # hatched		# Pairings											
Time to hatch / # natched		# Egg Case											
# natched		# Eggs /		<del> </del>						<del>                                     </del>		<del> </del>	<del>                                     </del>
Init./Date   12/1   12/2   12/3   12/4   12/5   12/6   12/7   12/8   12/9   12/10   12/1		# hatched		ļ <u>.</u> .				<u> </u>			ļ		<u> </u>
		Init./Date (1999)	12/1	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date:  $1 \sqrt{\mathcal{U}} \left( 99 \right)$  Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays32-42 42-53

iample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12592 G	# Males emerged			+			<u> </u>			<del> </del>		<del> </del>
	Male Time to		<del> </del>	+		+	+	<del> </del>	<del> </del>		<del></del>	+
	Mortality (days)								]			
	# Females emerged						61			1	1	
			<del></del>		<u> </u>	<u> </u>	10L	ļ		<del> </del>	<u> </u>	ļ
	Females Time to Mortality						OP					
	(days) Cumulative		<del></del>	+	<del></del>	<del></del>		<del> </del>		+		<del> </del>
	number emerged			]	1	ļ	19616	+	]			
	# Pairings		1		1					1	<b>—</b>	
			<del> </del>	+			-		<u></u>			<u> </u>
	# Egg Case									}	j	
	# Eggs / Time to hatch / # hatched		<u> </u>		<del>                                     </del>							
12592 H	# Males emerged									1		
	Male Time to		<del> </del>	<del> </del>	+	<del></del>	+		<del> </del>	<del> </del>	<del> </del> -	<del></del>
	Mortality (days)		}		-			$\mathcal{O}$	<u></u>	1	.	
	# Females emerged						13 Sm	pul_				
	Females Time to Mortality		<del> </del>	<del> </del>	<del> </del>	+	OP			<b>†</b>	<b>†</b>	<del> </del>
	(days) Cumulative		<del></del>			<del>- </del>	10,	<del></del>	<del></del>			<del></del>
	number			}		1			1	}		
	emerged		<del> </del>	<del> </del>		+	+	<del> </del>	<del> </del>	<del></del>		<del> </del>
	# Pairings			<u> </u>			<u> </u>				<u> </u>	<u> </u>
	# Egg Case											
	# Eggs / Time to hatch / # hatched			-						<del> </del>		
<u> </u>		12/1	12/2	12/3	12/4	12/5	1215	12/7	12/8	12/9	12/10	12/11
	(1999)		<u> </u>	<u> </u>		ــــــــــــــــــــــــــــــــــــــ	±12	<u> </u>				<u> </u>
ergence sco		any p	upae wr	nch die	(D) before	re emerg	jence. D	= dead	for flies	which e	merge bi	ut are n
viving. $P = p$	upa						·					
nents:	(1) Laru	~ ~	10/10	لمما	N 60	10		<u> </u>				
			believ	ieve	been		37	$\overline{}$	vepl.	773		
	7he7	- m	<del>2</del> 2 1	cvt	שרנית	<u>Depo</u>	SITTO	10	reper	(d) C	7583	
<del></del>	NC &	<i>y</i> (			<del></del>							
									<del></del>			
				<del></del>	<del></del>			<del></del>				
			<del></del>					<del></del>				

Review: \_\_\_\_\_ Date: /2/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12593 A	# Males emerged		<del> </del>	-		1		-				1
	Male Time to	<del> </del>	<del></del>	<del></del>	<del> </del>	-	<del> </del>	<del>                                     </del>		1-1-	<del> </del> -	70
	Mortality (days)	ļ		1	1	19" NA	l	2d/117		300	į	7d
	# Females emerged		<del> </del> -	<del>                                     </del>		1		1		1		141-20
		<u> </u>	<u> </u>	ļ	<u> </u>			<b></b> _		<b></b>	<u> </u>	
	Females Time to Mortality (days)					40117	<b></b>					
	Cumulative number	ļ				2	11	2		14		
	emerged	<del> </del>	<del></del>	<del> </del>	<del> </del>	1	Vistano	<del> </del>		<del>                                     </del>	<del> </del>	-C-
	# Pairings					<u>                                     </u>	8 11/1:3					
	# Egg Case										<u> </u>	
	# Eggs / Time to hatch / # hatched											
12593 B	# Males emerged		ID		l							
	Male Time to Mortality (days)		000		1d,113					50,10	<b>9</b> -	
	# Females emerged						1					
	Females Time to Mortality (days)						49718	20117				
	Cumulative number				$\overline{\gamma}$		2	11		5	1	
•	emerged		<del>  '</del>	ļ	0	ļ	<u> </u>	1		1	<u> </u>	
	# Pairings		<u> </u>			<u> </u>	W/593E2	7593				
	# Egg Case						,		*	366	io.	
	# Eggs /			<del>                                     </del>	-					1 24		ta D
	Time to hatch / # hatched							<b> </b>		Ohate	h 10% h	atch
12593 C	# Males emerged			1		•				1423	1423	
	Male Time to			1	<del> </del>	<del> </del>		<del> </del>		<del>                                     </del>		
	Mortality (days)		ł	30/1/8		}		1				
	# Females emerged				1	1	j	,				
	Females		<del> </del>		1					ļ		
	Time to Mortality (days)			<b>j</b>	Ship	12,114						
	Cumulative		<del> </del>		1	2		<del> </del> -	<del> </del>	<del>                                     </del>	<del> </del>	
	number emerged		<u> </u>	1	<u>                                     </u>	10						
	# Pairings			ļ !	607	w/593€ 017,3						
. [	# Egg Case					1,060						
	# Eggs / Time to hatch / # hatched	<del></del>				5 min 200	عدلا					
<del></del>	Init./Date (1999)	11/9	11/10	11/11	12/12	14/13	11414	11/15		11/17 1/17	11/18	11419
nergence scorviving. P = p	ring: Record	any p	upae whi	ch die (	i) before	emerge	ence. D	= dead	or flies	which en	nerge bu	t are not
rviving. P = p	upa	•		•	(32)	ooth 1	417 0	SLEW	1592	B) 34.	earea	$\mathcal{C}$
·			> iouth Burli					- (	, <del>, , , , , , , , , , , , , , , , , , </del>	7	2 11/22	, t(~

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Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31	7
12593 D	# Males emerged		+	<del> </del>	<del></del>	-	10		-			<del> </del>	1
	Male Time to	<del> </del>	+	<del> </del>		<del> </del>	1 1				<del> </del>	<del> </del>	1
	Mortality (days)	}		j		)	302/A	i	]	}		}	1
	# Females emerged								1			1 10	Scap
	Females Time to Mortality		<del>                                     </del>						4d1130		ļ .	20,731	
	(days) Cumulative	<del> </del>		<del></del>		<del> </del>	<del> </del>		1111	<del></del>	<del> </del>	100	1
	number emerged								2			14	ļ.
	# Pairings								W/593			4593A	
	# Egg Case										71052	1	\
											MASO	<u> </u>	1.
	# Eggs / Time to hatch / # hatched	ł					Be				na4 =	bootinhat tohing	Pre
12593 E	# Males emerged		(ID)		imale, escaped	1 1,00	(a)						
	Male Time to Mortality		¥34 X		<del>'</del>	7d,130						<u> </u>	1
	(days) # Females emerged		11/13 00			2111			<u> </u>				1
	Females Time to Mortality								<del> </del>		<del> </del>		40
	(days) Cumulative		<del> </del>			<u> </u>			<b></b> _		<del> </del>	<del></del>	4
j	number emerged	·	2			5		·					<b>**</b>
	# Pairings	·				!							W/3
	# Ego Case												
	# Eggs / Time to hatch / # hatched	····											1.
12593 F	# Maies emerged	<del></del>		escuped		i				1			1
	Male Time to Mortality					1	40,118	<del></del>	50/1/24	604/23	<del></del>		
	(days) # Females		<del> </del>	!		·	1		<del>- '''</del>	<u> </u>	-	<del> </del>	1
	emerged		<u>}</u>	<u> </u>			1						
	Females Time to Mortality (days)					i	30,11						
	Cumulative number emerged					:	3		4	5			
-	# Pairings					<del></del> -	1						1
	# Egg Case		<del>                                     </del>			<u></u> :						<del> </del>	1
	# Eggs / Time to hatch /					<del></del> ,							1
	# hatched Init./Date	11/9	11/10	11/21	1/10	11/12	11/1/	11/15	11/16	11/17	11/10	11/10	1
	(1999)	1113	11/10	: Yim	4	11/13	1-16	11/15	11/16	11/17	11/12	11/19	14/2

Review: \_\_\_\_\_ Date: | L / L | 49
Laboratory: Aquatec Biological Sciences, South Burlington, Variant

Sample / Repl.	Peancasa	04	- 00	1 00	<del></del>	25	26	1 27	20	1 20		24
Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12593 G	# Males emerged				į <b>į</b>		]					
	Male Time to Mortality			-	50 118 50 118							50,124
	# Females emerged		<del> </del>	<del> </del>	Ψ0-11 <sup>1</sup>		<del> </del>				<u> </u>	- "'
	Females Time to Mortality (days)		-	<del> </del>				Admin		20,1119		
	Cumulative number emerged				<del></del>			2	7	3		4
	# Pairings							W/5/5/		W/593A 811/17	1	
	# Egg Case									80	2/2/088	
	# Eggs / Time to hatch / # hatched				. [						LGOO UNI	1
12593 H	# Males emerged			1 Aine 1 Dead	1							
	Male Time to Mortality (days)			190,1120				50/1120		4/23/2		
	# Females emerged								_	1		
	Females Time to Mortality (days)									601/23		
	Cumulative number emerged			2				3		5		
	# Pairings		<u> </u>							1		
	# Egg Case								<del></del>			
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/9	11/10	13/11 -	13	11/13	11/14	11/15	11/16	11/17	11/18	11/19
ergence sco	ing: Record	any p	upae wh	ich die (.	ore	emerge	ence. D	= dead f	or flies	which en	nerge bu	it ere n
viving. P = p nents:	upa											
			·									
					<del></del>							
			·									
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		alad		
Review:	Date:	14211	99	
l aboratory: A	Mater Biological	Sciences	South Burlington	Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/20/99 Sample / Repl. Response 32 33 34 35 37 38 39 40 41 42 36 # Males 12593 A emerged Male Time to 50/1/28 Mortality (days) # Females emerged Females sd<sub>ill</sub>ad Time to Mortality (days) Cumulative number emerged 11/199 11/5930 # Pairings 10/827 # Egg Case # Eggs / Time to hatch / # hatched # Males 12593 B emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged 111262 wis9300 1127 # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12593 C emerged Male Time to Mortality (days) # Females emerged Females 50,130 Time to Mortality (days) Cumulative number 0 emerged 593(9W25 w|593 |11/1/23 # Pairings 7015436 WIDY # Egg Case 1.01660 21254 194 Mnh. 12/1 # Eggs / ~150 miliatched Time to hatch / 123 unh 12/2 · How 82 # hatched 11/25 M 11/26. Init./Date 11/20 11/22 11/27 11/29 11/30 (1999)Emergence scoring: Record any purae which die (D) before emergence. D = dead for flies which emerge but are not

> Couldn't ac day 7 (curt on lati jun egg case discardéd 11130

(-D) y 6 Ove ores)

surviving. P = pupa

\_ Date: 12 21 99

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 27<sub>38</sub> Sample / Repl. Response 24 35 25 28 38/ 26 28 40 # Males 12593 D emerged Male Time to Mortality (days) # Females emerged Females 60 11/27 Time to Mortality (days) Cumulative 5 number emerged w3635.131 # Pairings # Egg Case ¥, 0 1,526 354nh 1128 1, 33 4nh 1124 # Eggs / 2400 Time to hatch / ~100 # hatched # Males 11/27 Hunhatched 4/28 12593 E emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12593 F emerged Male Time to 4 d 13/8 40/25 Mortality (days) # Females emerged Females 54/130 Time to Mortality (days) Cumulative 7 number emerged W/593H # Pairings 11/19 130941 # Egg Case 75 my atched 12/4 # Eggs / Time to hatch / # hatched 11/20 11/23 Init./Date 11/24 11/26 11/29 (1999)Emergence scoring: Record any pupale which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa Correction Julisotos

Review: Date: 12/21/94
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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12593 G				334	35	25/6	28 37	38	39	29/	39	31,
Mortality (days)   Females   Femal			233							1		
# Females emerged  # Pairings  # Egg Case  # Face Time to Mortality (days)  # Egg Case  # Pairings  # Face Time to Mortality (days)  # Face Time to Mortality (days)  # Females	rtality		Sdulah							40,212		
Time to Mortality	emales		1				1			•		
# Egg Case  # Egg Case  # Egg Sase  # Egg Case  # Egg Case    1	Mortality		15.50 pt	4			30/1/38					
# Eggs / Time to hatch / # hatched   1, 430   1,	mber	_	(o \		ئار		<u> </u>			8		
# Eggs / Time to hatch / # hatched	airings		1	A POCO PO			W/5934 11/23					
# hatched # Males # Males # Males # Males # Males # Males # Males # Males # Males # # Females # # Females # # Females # Females # Females # Females # Females # Males	g Case			10								
# Males emerged    Male Time to Mortality (days)	o hatch /			1,430	11280							
Mortality (days)	Males					···		<u> </u>				
# Females emerged  Females Time to Morbitly (days)  Cumulative number emerged  # Pairings  # Eggs / Time to hatch / # hatched  Init./Date (1999)  Init./Date (1999)  mergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not reviving. P = pupa	rtality				50,1135	***				-		
Time to Mortality (days)	males											
# Egg Case  # Egg S/ Time to hatch/ # hatched  Init./Date (1999)  Inergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not polying. P = pupa	Mortainty											
#Egg Case  #Egg S / Time to hatch / # hatched  Init./Date (1999)  Init./Date (1999)  Marked Init./Date (1999)  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Init./Date (1/20 11/21 11/22 11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Init./Date (1/20 11/24 11/25 11/25 11/26 11/27 11/28 11/29 11/30  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Egg Case  #Init./Date (1/20 11/24 11/25 11/25 11/26 11/27 11/28 11/29 11/30  #Init./Date (1/20 11/24 11/25 11/26 11/27 11/28 11/29 11/30  #Egg Case  #Init./Date (1/20 11/24 11/25 11/25 11/25 11/26 11/27 11/28 11/29 11/30 11/30 11/25 11/26 11/27 11/28 11/29 11/30 11/30 11/25 11/26 11/27 11/28 11/29 11/30 11/29 11/30 11/29 11/30 11/29 11/30 11/29 11/30 11/29 11/30 11/29 11/30 11/29 11/30 11/29 11/30 11/29 11/29 11/30 11/29	mber		5		6							
# Eggs / Time to hatch / # hatched   11/20   11/21   11/22   11/23   11/24   11/25   11/26   11/27   11/28   11/29   11/30	airings											
Init./Date 11/20 11/21 11/22 11/23 11/24 11/25 11/26 11/27 11/28 11/29 11/30 (1999)  mergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not projected.	g Case											
nergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not	hatch /					****				1		
nergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not		1/20	11/21	1//32	11/23	<i>11/24</i>	11/25	11/26	11/27	1//28	11/29	11/30
ments: (i) CONRECTION JUN 11/22  (c.) Test day correction Tu/30/89	Record	any pu	pae whi		) before	emerg	ence. D	= dead	for flies		nerge bu	it are not
C) Test day corrector July			<u> </u>	Oreci	nan 1	11/	2					
73422			2.	) 10	5- 1	111	Tarre 1	ヘカル		-11/-	10/09	
						1						
		males o Mortality days) nulative imber verged dairings grase	males o Mortality days) nulative imber recred dairings  g Case  ggs / to hatch / atched Males recred  Time to males recred	males o Mortality days) nulative imber verged  ggs / to hatch / atched  Time to males or Mortality days) emales erged males erged males erged males erged males erged males erged males o Mortality days) emales erged airings g Case  ggs / to hatch / atched  All the males are the male	males o Mortality days) nulative imber verged ggs / to hatch / atched  Time to to traitity days) semales erged males erged males erged males g Case  175 unh males g Case  185 unh males grape males grape males grape males grape males grape males grape males grape males grape males grape males grape males grape males grape males m	males o Mortality days) nulative imber verged ggs / to hatch / atched  Time to males erged males erged males erged males grant from the to days) grants from the to males erged males grants from the to days) grants from the to days) grants from the to days from the total to days from the total	males o Mortality days) nulative imber verged ggs / to hatch / atched  Time to males erged males erged males erged males males erged males	males o Mortality days) nutative miber lerged  Pairings  Page 1	males o Mortality lays)  Indicate to males with the motion of the motion	males o Mortality says)  agroup of the company of t	males o Montality lays) lays) lays	males of Mortality (ask)

Review: Date: (2/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12593 A	# Males emerged											
	Male Time to Mortality (days)							OL				
	# Females emerged							OP				
	Females Time to Mortality (days)		1.	1		1	<del> </del>					
	Cumulative number emerged			1								
	# Pairings							-				
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12593 B	# Males emerged											
	Male Time to Mortality (days)							OL				
	# Females emerged							OP				
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings									<u> </u>		
	# Egg Case											
	# Eggs / Time to hatch / # hatched										1	
12593 C	# Males emerged											
	Male Time to Mortality (days)							OL				
	# Females emerged							OP				
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											1
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
<del> </del>	Init./Date (1999)	12/1	12/2	12/3	12/4	12/5	12/6	睽	12/8	12/9	12/10	12/1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date: 1 2/2/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays3<del>2-42</del> +3-53

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12593 D	# Males emerged											
	Male Time to Mortality (days)							OL				
	# Females emerged							SP				
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12593 E	# Males emerged											
	Male Time to Mortality (days)							0				
	# Females emerged							OP				
	Females Time to Mortality (days)											
	Cumulative number emerged	-										
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12593 F	# Males emerged											
	Male Time to Mortality				<u> </u>		<u> </u>	0				
	(days) # Females emerged		<del> </del>					3P				
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	12/1	12/2	12/3	12/4	12/5	12/6	12/2	12/8	12/9	12/10	12/11

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date: 12/2/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays32-42 43-53

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12593 G	# Males emerged							<del>                                     </del>			<del> </del>	
	Male Time to Mortality (days)				<del></del>			RZ	-		-	
	# Females emerged				<del></del>			06	•			
	Females Time to Mortality (days)	,										
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12593 H	# Males emerged											
	Male Time to Mortality (days)							()]_				
	# Females emerged							OP				
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case					:						
	# Eggs / Time to hatch / # hatched		1				<u> </u>	1			<del>                                     </del>	
	Init./Date (1999)	12/1	12/2	12/3	12/4	12/5	12/6	12/10	12/8	12/9	12/10	12/1
nergence sco	ring: Recor	d any p	oupae wh	nich die	(D) befor	e emerg	ence. [	= dead	for flies	which e	merge bi	ut are
rviving. P = p ments:	oupa		<del></del> -			<del></del>		<del>-</del>				<del></del>
							·					
										<del></del>		
							<del> — — —</del>				- <del></del>	<del></del>

Review: \_\_\_\_\_\_ Date: 12/2( [99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays3<del>2-42</del>

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Test Start: 10/19/99 Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Sample / Repl. 26 27 23 24 25 28 29 30 31 Response 21 22 # Males 12609 A Male Time to 10,117 Mortality (days) Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12609 B emerged Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12609 C emerged Male Time to 741/23 Mortality (days) # Females Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched 1.1/16 MM 11/9 11/10 Init./Date 11/12 11/13 11/14 11/15 Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

12/21/94

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Date:

000071

BTR: 3615 / 3622 Project: 99033 M-C Dead Creek Test Start: 10/19/99 Sample / Repl. Response 24 21 23 25 26 31 22 27 28 29 30 # Males 12609 D emerged Male Time to (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12609 E emerged Male Time to 64 5 6d 50 Mortality (days) # Females emerged Sa Females Time to Mortality 11/13 (days) number emerged WKOAF # Pairings 96 # Egg Case # Eggs / 11252 1752 mod 1/25 Time to hatch / # hatched # Males 12609 F emerged Male Time to Adilia 69/125 Mortality (days) emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case Time to hatch / # hatched\_ 11/12 Init./Date 11/9 11/10 11/11 11/13 11/15 11/17 (1999)

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: \( \frac{1}{2} \seta\_1 \) \( \frac{1}{9} \)
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12609 G	# Males emerged			,	<del>                                     </del>				-			
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12609 H	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged										<u> </u>	
	Females Time to Mortality (days)									ļ		
	Cumulative number emerged		ļ		ļ		ļ <u>.</u>					
	# Pairings		<u> </u>									
	# Egg Case										}	
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/9	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19
nergence sco rviving. P = p ments:		d any p	upae wh	ich die (I	D) before	e emerg	ence. D	= dead	for flies	which en	ner <del>ge</del> bu	it are r
	·····											

Review: \_\_\_\_\_ Date: 12/2/29
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/20/99 Sample / Repl. Response 32 33 36 34 35 37 38 39 40 41 42 # Males 12609 A emerged Male Time to 401/27 Mortality (days) # Females Females 34/26 Time to Mortality (days) Cumulative 4  $\langle O \rangle$ number emerged # Pairings # Egg Case 1,053 Ornated disingulated 11/29 # Eggs / Time to hatch / # hatched except 12609 B # Males emerged Male Time to Mortality (days) emerged Marit 3g/3 Females 6d 1130 Time to Mortality (days) 3 Cumulative number emerged WOO'NET 4/601F W609D # Pairings 0 11/29 # Egg Case 1,921 whatched O'shatch 12/4 a samp drug # Eggs / Time to hatch / # hatched 55 unnatohed 1/24 # Males 12609 C emerged Male Time to 20/33 Mortality (days) # Females emerged 42/3 Females نطهار 80,1/30 Time to Mortality (days) Cumulative 5 0 number emerged WKOJF Who !! # Pairings # Egg Case # Eggs / Time to hatch / # hatched 11/21/11/22 1,1/28 11/20 Init./Date 11/23 11/26 11/27 (1999)Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/21/99
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Couldn't do duy 7 (cun't of hatching egg (ase ctdays32-42)

Clis Carded 11/30

Midge (Chironomus tentans) Chronic Toxicity Test Biological Monitoring Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99 Sample / Repl. Response 22-**23** 25/3C 27 24 26 28 29 40 # Males 12609 D emerged Male Time to 19/38 Montality 13d,2/2 (days) # Females emerged Females (days) Cumulative 3  $\mathcal{A}$ number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12609 E emerged 30/2 Male Time to Mortality (days) # Females emerged Females 50,130 Time to Mortality (csvs) Cumulative W16090 60 50 50 P emerged # Pairings # Egg Case  $c_{j}$ 142 864 jaunhatched 11/20 # Eggs / n 186 untatched 175 untatched Time to hatch / # hatched 7 unhatored 11/2 # Males 12609 F emerged Male Time to 30/3/2 68 12/3 Mortality (pays) # Females emerged Females 40,1725 Time to Mortality (days) unwpet emerged w/609/123 # Pairings # Egg Case 1635 # Eggs / 207 W.H. 121, Time to hatch / no unh. 12/2 # hatched Init./Date 11/20 11/23 11/24 11/25 W 11/23-1/28 11/29 11/30 (1999)Emergence scoring: Record any pupee which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Date: 12/2/199

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23 11/24 11/25 11/26 11/27 11/28 11/29 11/30
efore emergence. D = dead for flies which emerge but are not ing. P = pupa

Deg Correction (1/30/2)

ctdays32-42

Sample / Repl.	Response	21-37	22	23-	24 35	25	-25 -37	27	28	29 40	30	-31 4
12609 G	# Males emerged										-	
	Male Time to Mortality (days)			1								
	# Females emerged											
	Females Time to Monality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched			+	+	<del> </del>					<del> </del>	
12609 H	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings									ļ		
	# Egg Case		}									
	# Eggs / Time to hatch / # hatched	L <u></u>				<del> </del>	<del> </del>			<del> </del>		
	Init./Date (1999)	11/20	11/21 JM	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30
ergence sco viving. P = p	ring: Record	any pu		ich die (l	D) before	e emerg	ence. D	= dead	for flies	which er	nerge bı	ut are n
nents:		07-	55	D24	Con	1007	on (	T11/3	0/99			
									<del></del>	<del></del>		

Review: Date: 12/2/ (99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3615 / 3622 Test Start: 10/19/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12609 A	# Males emerged											0
	Male Time to Mortality (days)											06
	# Females emerged											OP
	Females Time to Mortality (days)											1236
	Cumulative number emerged											
	# Pairings											
	≠ Egg Case											
	# Eggs / Time to hatch / # hatched											
12609 B	# Males emerged											
	Male Time to Mortality (days)											00
	# Females emerged											OP
	Females Time to Mortality (days)						ļ	<u> </u>				12/13 13/13
	Cumulative number emerged									<u> </u>		
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched	<u>.</u>										
12609 C	# Males emerged					}						
	Male Time to Mortality (days)											OL
	# Females emerged											CP
	Females Time to Mortality (days)											17/36
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	12/1	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa t = 0.000

Review: Date: 12/21/29
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays 82-42 43-53

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	185
12609 D	# Males emerged		1				-		·		<del> </del>	#
	Male Time to Mortality		4126		<del></del>							
	(days) # Females emerged	1		<del> </del>								07
	Females Time to Mortality (days)	(ad <sub>(2)</sub> 7										12/
	Cumulative number emerged											
	# Pairings	m/6090										
	# Egg Case		12 1102 13 unb.	12/4								
	# Eggs / Time to hatch / # hatched		10 unh	149								
12609 E	# Males emerged											
	Male Time to Mortality (days)											01
	# Females emerged											Oi
	Females Time to Mortality (days)											13/13
	Cumulative number emerged	<u> </u>								<u></u>	ļ	
	# Pairings											
	# Egg Case							 				
	# Eggs / Time to hatch / # hatched											
12609 F	# Males emerged											
	Male Time to Mortality (days)											OL
	# Females emerged		<b>h</b> .		1		1					08
	Females Time to Monality (days)		41146		50,29		38 1319					1313
	Cumulative number emerged		7		8		9					
	# Pairings		13/5 N/001		18142		2142	100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8			
	# Egg Case			1723				12/392				
	# Eggs / Time to hatch / # hatched			30 unh	12/9			Sunta				
	Init./Date (1999)	12/1	12/2	12/3.	12/1	12/5	12/6	12/7	12/8	17/9	12/10	12/1

Review: \_\_\_\_\_ Date: 12/2/49

Review: \_\_\_\_ Date: 12/2/49

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ect: 99033 M	-C Dead Cr	eek	ВТ	R: 3615	/ 3622			Te	st Start	10/19/	99	<del></del>
Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12609 G	# Males emerged			-							1	33
	Male Time to Mortality (days)				7			<b> </b>	†			OL
	# Females emerged								1		<del> </del>	QP
	Females Time to Mortality (days)								<u> </u>			10/3/5
	Cumulative number emerged											
	# Painings					<u> </u>						
	# Egg Case									ļ		
	# Eggs / Time to hatch / # hatched					<u> </u>		<del> </del>		<del> </del>		
12609 H	# Males emerged											
	Male Time to Mortality (days)											OL
	# Females emerged											0,0
	Females Time to Mortality (days) Cumulative											17/13
	number emerged		-			ļ	ļ					
	# Pairings											
	# Egg Case	j										
·	# Eggs / Time to hatch / # hatched											
	(1999)	12/1	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11
nergence sco rviving. P = p ments:	ring: Recor upa (=	d any p	upae wh	nich die (	D) befor	e emerg	ence. [	e dead	for flies	which e	merge bi	ut are no
		· · · · · · · · · · · · · · · · · · ·			- <del></del>		·				<del></del> .	

Review: \_\_\_\_\_ Date: 12/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays3<del>2 42</del> 43-53 000079

# Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ate: /0//6	No. of Egg Cas			
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use	
10/16	0	19.2°C	~		\$	
10/17	1	19,300				
10/18	2	226		+ Color TIP		
10/19	3				10/19	r. chonic
10/20	4	, 6.7			10/20 C.	t.chronic
	5					

Source: Aquare cultures

## Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ate: 10/15	No. of Egg Cas	es 7	1	
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use	
10/15/99	0	119.0°C		7cases		
10/16	1	6				
16/17	2	20,3	JG V 46-14.			
10/18	3	22.5		1 Leg in	led.	
10/19	4			i -	Ī	C-T. 10/19
10/20	5				Apronic	C.T. 10/19 START C.T. 10/20 START
,						START

Source: Aquarec cultures

### Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use
10/26	0				
10/27	1				
10/28	2				
10/29	3	23.5		Herching	Aux ma
	4				
	5				

Samples 12548, 12550, 12551, 12552, 12592, 12593, 12609 Auxil. Mele beevers (reps m. N. O, P)



																		62/01	a) in fred	5012 cate.).	desp
10/19/99		10	2000	7.4	一大	×	33.5	45	4.6	×	28. C. 2. C.	7.6	5.0	×	20.9 C	7.6	5,8	×	10/29	roup.	<b>\</b>
- 1		6	428		4.9	×	0,62		7.8	×			4.7	×			A.S	×	19/78	this testing g	Dore of
2 Test Start	1	8	4. cg	40	<u>-</u>	×	100	76	8.2	×		76	4.4	×		4.4	4.1	×	1987	and end	(
35/9/3622	0	7	100 PE			315	4500			335				340				350	19/28	Ne test a   20, 40,	
BTR: 3	lysis	9	1.5%	75	5.5	×	3.4	7.6	5.4	×		7.6	5.5	×		7.6	<u>و</u>	×	19/25	iker placed Withip the tesoles on Days 0, 14, 20, 4	
	Day of Analysis	r.	200	6 1	1	×		1 ,	)	×		1	)	×			١	×	10/24	er placed so on Da	
يد	Day	4	120	81	١	×		١	١	×		(	١	×		\	١	×	25 25 25 25 25 25 25 25 25 25 25 25 25 2	tative beak	
Dead Creek		8	4.66	46	6.9	×	4.6.6.C	7.7	(p.2	×	73.4 4.80 6.60	4	6.9			7.6	4,4	×	10/22 MM	presentati d hardnes	
99033 De		2	9.0°C	1	10		8.EE	1	43	×	93.6	\	6,3	×	227		\	×	1984 1984	of a repuity, and	
Project: 99		1	21.6	i	6.	×	21.5		6.7	×	12.4		800	×	22.4	}	4.6	×	19/20	urement o a, alkalinit O. / pH ermont	
		0	4.55	たっ	<u>ئے</u>	160h	223	29	82	3,0%	B22	73	6.9	30%	2.20	7.6	1:3	420/0	10/19	a measufe ammonia, a	
Cura & Associates		Parameter	T (°C)	Hd	DO (mg/L)	Conductivity	T (°C)	ЬН	DO (mg/L)	Conductivity	T (°C)	Hd	DO (mg/L)	Conductivity	(2°) T	Hd	DO (mg/L)	Conductivity	Init./Date (1999):	asured temperature is tivity weekly. Collect Date: 12/21/6p ological Sciences, South Bu	
Project: Menzie-Cura		Sample	12548				12550				12551				12552					Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this test.  Measure conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.  Review: Date: 12/21/pp Date: 12/21/p	<b>_</b> ′

Parameter	Project: Menzie-	Menzie-Cura & Associates	Pro	Project: 99	99033 Dead Creek	ad Cree	يدا		BTR: 3	19/362	35/9/3622 Test Start		10/19/99
Sample   Parameter   0							Day	of Ana	1	6			
12592   T (°C)   323 31.9 33.7   7.7   7.3   7	Sample	Parameter	0	-	2	3	4	5	9	7	ھ	6	9
Ph   24   7.8   7.7   7.3   7.7     DO (mg/L)	12592	T (°C)	723	21.9	22.7		١	1					12. 4. C.
12593   T (°C)   2/2   2/3 4 \( \triangle 2 \)		Hd	62		)	8.4	(	1	4.4		7.3		4.16
12893   T (°C)   26.2   33.4   20.8		DO (mg/L)	3-7	43		0,0	(	1	0.0		3.3	4.7	1C
12593   T (°C)   222 33.4 52.9   7.4   7.5   7.6   7.7   7		Conductivity	370	×	1	×	×	×	×	340	×	×	×
DO (mg/L)   72   6.3   5.4   6.1     5.2   5.0   5.3   4.9	12593	T (°C)	222	22.4									23.9
12609   T (°C)   3/4   33.5   33.7		Hd	82	)	)	7.7	1	\	76				7,6
12609   T (°C)   31/4   32.5   32.7		DO (mg/L)	12	6.8	5.9	6			5.2		5.0	8	49
12609   T (°C)   3/4   33.5   33.7		Conductivity	12/		×	×	×	×	×	340	×	×	×
DO (mg/L)	12609	T (°C)	HK.	22.5									20.00
DO (mg/L)   C.C   S.G   S.G   C   C   S.G   S.G   S.G   G   G   G   G   G   G   G   G   G		Hd		)	}	7.5	1	1	7.5		7.6		#±
T (°C)   PH   Ph   Ph   Ph   Ph   Ph   Ph   Ph		DO (mg/L)	79	5.9	5,5	S.2	(	į	5.5		S/3	5.6	141
T (°C)  pH  DO (mg/L)  Conductivity  Comments: Measured temperature is a measurement of a representative beaker placed withing the test array for this testing ground may be a conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0,14, 20, 40, and end of test.  A Comments: Measure conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0,14, 20, 40, and end of test.  A Comments: Measure conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0,14, 20, 40, and end of test.  A Comments: Measure conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0,14, 20, 40, and end of test.  A Comments: Measure conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0,14, 20, 40, and end of test.  A Comments: Measure conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0,14, 20, 40, and end of test.		Conductivity	3%,	×	×	×	×	×	×	350	×	×	×
DO (mg/L)		T (°C)									\		
Conductivity X X X X X X X X X X X X X X X X X X X		Hd						\ 					!
Conductivity X X X X X X X X X X X X X X X X X X X		DO (mg/L)			\								
Init./Date (1999): 10/19 19/20 10/24 19/23 19/24 19/25 19/26 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29 19/29   19/29 19/29   19/29   19/29   19/29   19/29   19/29   19/29   19/29   19/29   19/29   19/29   19/20		Conductivity		*	×	×	×	×	×		×	×	×
Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing grou Measure conductivity weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.    Poster		Init./Date (1999):	10/19	19/20	1086	19/27	1 1	1978		1926	19837	19738	1989
Date: 12/14/99 Aquatec Biological Sciences, South Burlington, Vermont.	Comments: Meas	sured temperature is vity weekly. Collect	a meast	ırement a alkalir	of a repr	ekentati nardnes	ve beake s sample	er placed s on Da	Within t	he test a	array for	this testi	ng grou
Aquatec Biological Sciences, South Burlington, Vermont.	sview: Da	ate: 12/4/99				1	).o.	H He	Lee Du	3 2 2 2	enly	رسابهال	( M)
	envchr.doc shoratory: Aquatec Biolo	ogical Sciences. South Bu	rlinaton. V	ermont									

000034

Project: Menzie-(	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dea	Dead Creek	٧		BTR: 35	354913622	Z Test Start	1	10/19/99
						Day	Day of Analysis	ysis	P			
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	24
12548	T (°C)	929	93.9	100	22.6		800	30,00	200	43.4	8,00	88/ 19/16 17:
	Н		51	g <b>k</b> +		75		755		2	7,6	à de la companya de l
	DO (mg/L)	}		0,0		0 0 0		1857			50	
	Conductivity	×	×	×	320	×	×	X,	×	×	338	×
12550	T (°C)	43.8			125.27 12.32.4							
	Н	1	١	45		44		74			91t	
	DO (mg/L)		1	5,4		N.8		8.7			5,5	
	Conductivity	×	×	×	310	×	×	×	×	×	330	×
12551	T (°C)	23.8 7.8 8.6 8.6 8.6 8.6 8.6 8.6 8.6 8.6 8.6 8										
	Hd		١	45		45		75/			44	
	DO (mg/L)	1	\	3		N N					6.0	
	Conductivity	×	×	×	320	×	×	×	×	×	330	×
12552	T (°C)	23.68 C. E.S.										
	Hd		7	26		46		7.6			44	
	DO (mg/L)	}	1	4.9		<u>ر</u>		h 1			40	
	Conductivity	×	×	×	340	×	×	×	×	×	2000	×
	Init /Date (1999):	10/30	1983	36	14gn	133	11/4	11/6	11/18	14.6	11/8	4FB
Comments: Measured	Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group	rement of	a represe	ntative bea	aker place	d within the	e test arra	y for this t	esting gro	o66.		
Measure D.O. and nH	Messure D. and pH.3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test	ivity once	Weekly C	offect amn	nonia alka	dinity and	hardness	samulas	O Sys O	14 20 4	Dand pag	of test

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Date: 12/2/99

Review:
ctenvchr.doc
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project Menzie-	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 De	Dead Creek	<u></u>		BTR. 2	25/0/2622	Toet Ctar	- 1	40/40/00
						Day	of Ana	.	0		1	
Sample	Parameter	44	12	13	14	15	16	17	18	19	20	21
12592	T (°C)	33.19										
	На		1	大井		44		7.(			57	
	DO (mg/L)		1	0		5,3		10			6,3	
	Conductivity	×	×	×	335	×	×	×	×	×	3/2	×
12593	T (°C)	33.1										
	Hd		1	215		79.		72			7,8	
	DO (mg/L)		\	5.4		49		5			t e	
	Conductivity	×	×	×	335	×	×	×	×	×	340	×
12609	T (°C)	18 10 10										
	Hd		1	7,4		73		78			4,5	
	DO (mg/L)		\	4,6		474		2,5			) - - -	
	Conductivity	×	×	×	340	×	×	×	×	×	1 m	×
	(°C)								   			
	Hd	}	l									
	DO (mg/L)		\									
	Conductivity	×	×	×		×	×	×	×	×		×
	Init./Date (1999):	200 800 800 800 800 800 800 800 800 800	Tella T	芸の	13/2 13/2	治	11/4	1173	11/6	<b>F</b>	11/8	128
Comments: Measured	Comments: Measured femberature is a measure	rement of	a represe	a representative beaker placed within the test array for this testing grown	aker place	d within th	e Jest arr	v for this t	esting aro	Ę		

Comments: Measured temperature is a measurement of a representative beaker placed within the lest array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Date: 12/21/99

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Sample Parameter 22 23 24 25 26 27 28 29 30 31 32 12548 T (°C) 22.22.23 24 25 26 27 28 29 30 31 32 32 12548 T (°C) 22.22.22.22.23.24.25.23.24.25.24.25.24.25.	Project: Menzie-(	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 De	Dead Creek	<b>Y</b>		BTR: 36	315 / 22	3615 / 22 Test Start 10/19/99	art 10/1	66/6
22 23 24 25 26 27 28 29 30 31 228, (25, 25, 25, 25, 25, 25, 25, 25, 25, 25,							Day	of Anal	ysis				
22.8.1.39.2.3.2.3.2.3.1.3.1.33.2.2.2.1.3.1.3.2.2.2.1.3.1.3	Sample	Parameter	22	23	24	25	26	27	28	29	8	31	32
7.5 $7.7$ $7.7$ $7.5$	12548	T (°C)	22.8/		E		R / U	23.33	22.2	Ser Ser	37.6	Take	I \ _ \
4.1		Hd	7.5			<b>P</b>		17	-			7	
X		DO (mg/L)	4.		6.4			6.1	5.5			7	
7.5 $7.6$ $6.4$ $7.5$ $7.9$ $7.5$		Conductivity	×	×	×	×	×	×	725	×	×	×	×
7.5 7.4 7.5 7.4	12550	T (°C)											
$\frac{4.2}{x}$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$		Hd	7.5		4,6			7,5	7.5			75	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		DO (mg/L)	4.2		519			Sie	16.0	14		3	
7.5 $7.6$ $7.5$		Conductivity	×	×	×	×	×	×	1,00%	×	×	×	×
7.5 $7.6$ $7.5$	12551	T (°C)											
S.0 $G_1I$ $G_1G_2G_2G_2G_2G_2G_2G_2G_2G_2G_2G_2G_2G_2G$		Hd	7.5		7.6			45	7,5			7.5	
$\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$ $\times$		DO (mg/L)	5.0		0			6.9	651			~ /	
7.5 7.6 7.6 7.7		Conductivity	×	×	×	×	×	×	Sy.	×	×	×	×
7.5 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6 7.6	12552	T (°C)											
4.6       X		Hd	7.5		4,6			7,6	9%			1/2	
11/19 11/13 11/12 11/13 11/14 11/15 11/16 11/17 11/18 11/19 11/19 ement of a representative beaker placed within the test array for this testing group.		DO (mg/L)	4.6		50			8.9	7,4			66	
Fig. 11/14 11/12 11/13 11/14 11/15 11/16 11/17 11/18 11.		Conductivity	×	×	×	×	×	×	Ser	×	×	×	×
Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.		Init./Date (1999):	11/18	114	1963	1148	13/1/4	13/15	11/16	11/17	11/18	$\frac{11/19}{G}$	478
	Comments: Measured	I temperature is a measu	rement of	a represer	tative bea	aker place	d Within th	e test arra	/ for this to	esting gro	g	\ \ \	

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly.

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Review: Date: 177 clenvchr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

29 30 31 X X X X X X X X X X X X X X X X X X X	Project: Menzie-	Project: Menzie-Cura & Associates	Project:		99033 Dea	Dead Creek	عدا		BTR: 3	515 / 22	3615 / 22 Test Start		10/19/99
Parameter   22   23   24   25   26   27   28   29   30   31     T (°C)							Day	of Anal	ysis				
DO (mg/L)  PH  7.6  T(°C)  DO (mg/L)  PH  7.6  T(°C)  PH  7.6  PH  7.6  PH  7.6  PH  7.6  PH  7.6  PH  7.6  PH  7.6  PH  7.6  PH  7.7  PH  7.6  PH  7.7  PH  PO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  PH  DO (mg/L)  T(°C)  T(°C)  PH  DO (mg/L)  T(°C	Sample	Parameter	22	23	24	25	26	27	28	29	30	31	32
DO (mg/L) 3.7	12592	T (°C)											
DO (mg/L) 3.7		Hd	2.6		44			7.4				15	
Conductivity X X X X X X X X X X X X X X X X X X X		DO (mg/L)	3.7		6,3			613	25			63	
T(°C)		Conductivity	×	×	×	×	×	×	agr	×	×	×	×
DO (mg/L) 3.8 (c,6 5.6 (c,2 x x x x x x x x x x x x x x x x x x x	12593	T (°C)											
DO (mg/L) 3.8		Hd	7.6		77			4	7			76	
Conductivity X X X X X X X X X X X X X X X X X X X		DO (mg/L)	3.8		0,0			5.6	\ \?	,			
T (°C)  PH 7.5 7-16 7-16 7-16 7-16 7-16 7-16 7-16 7-16		Conductivity	×	×	×	×	×	×	200	×	×	×	×
7.5 7.6 7.6 7.6 7.5 × × × × × × × × × × × × × × × × × × ×	12609	T (°C)								,			
4.6 6.3 × × × × × × × × × × × × × × × × × × ×		Н	7.5		7,6			_	7.5		/	77	
X X X X X X X X X X X X X X X X X X X		DO (mg/L)	4.6		6.3			5.5	20			7.5	
1   1   1   1   1   1   1   1   1   1		Conductivity	×	×	×	×	×	×	380	×	×	×	×
11/19 11/17 11/18 11/18 11/16 11/19 11/19 11/19		T (°C)											
11/19 11/17 11/18 11/18 11/16 11/19 11/19 11/19		Hd										-	
11/19 11/11 11/12 11/13 11/14 11/15 11/16 11/19 11/19		DO (mg/L)											
11/19 11/11 11/12 11/13 11/14 11/15 11/16 11/17 11/18 11/19		Conductivity	×	×	×	×	×	×		×	×	×	× -
		Init./Date (1999):	多門	13//11	11/12	1-77	19/JE	12/22 12/22	11/16	11/17	11/1/8	11/19	11/20

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly

Date: 12/21/99

Review. 12/2:/29 ctenychr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

	Project: Menzie-(	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dea	Dead Creek			BTR: 3	3615 / 22	Test Start	1	10/19/99
							Day	of Anal	ysis				
	Sample	Parameter	33	34	35	36	37	38	39	40	41	42	43
	12548	T (°C)	7, 22 1, 62 13.62	rifu	4-/0	k ン	١ ٨	トヶ	(2) (2)	0.50	1/2	197	22
		Hd		7.6	8			150	8	3	70/10	4.3	4.4
		DO (mg/L)		5,2	8.9	15 po		2			5.5	4-	37
		Conductivity	×	×	1/0/2	×	×	×	×	×	×	56/	×
	12550	(°C)			•							(	
		Hd		45		2.6		27			4.5	1	1
		DO (mg/L)		4,4	572	4.8		30			5,7	1	(
	_	Conductivity	×	×	1/000	×	×	×	×	×	336×	)	×
	12551	T (°C)			A							(	<u> </u>
		Hd		7.6		7,6		75/			4.5	(	1
		DO (mg/L)		5.3	4.7	47		/; 9			6.0	1.	}
		Conductivity	×	×	15 C	×	×	×	×	×	XEXE	-	×
	12552	T (9C)											
		Hd		7.6		79.		7.4			14 N	7.4	4.4
		DO (mg/L)		6.7	7.	<i>ن</i>		4.0)			4.9	5.4	1:5
		Conductivity	×	×	1/1/0/24	×		×	×	×	×	330	×
		Init./Date (1999):	W/ki	<b>2</b>	pred/Li	11/24	V28/11	11/26	11/85	13/28	1100	11/30	uffer
Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group	Comments: Measured	temperature is a measu		a represer	ntative bea	aker place	d within th	e test arra	ny for this t	testing gro	up.		

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, tben weekly.

000033

						Day	Day of Analysis	lysis				
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	43
12592	T (°C)											
	Hd		カチ	7	47	Z Z	1.5			4.5	45	4.4
	DO (mg/L)		63		5.70		5.7			b.9	·   -	4
	Conductivity A+H/Amm.	×	×	360	×	×	×	×	×		350	)   
12593	T (°¢)										À	
	Hd		44		7.7		3.2			7.6	7.5	7.4
	DO (mg/L)		6.0	6.	25		20)			70	49	4
	Conductivity	×	×	102	×	×	×	×	×		350	× /
12609	T (°¢)			)								
	Hd		5		4		5/2			7.4	4.3	7.3
	DO (mg/L)		5.0	7	The state of the s		20			6.	4.4	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	Conductivity	×	×	1/25	×	×	×	×	×	1	335	×
	(၁ <sub>၇</sub> ) ၂											
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×	,	×
	Init./Date (1999):	11/21	14/23	11/23	11/24	13/25	11/26	11/27	11/28	17.00	<i>34436</i>	12/17 12/17

Comments: Measured temperature is a measurement or a representative useasor process.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly.

And a second phone weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly.

Review: Date: 12/24/59
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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

						Day	Day of Analysis	ysis				
Sample	Parameter	44	45	46	47	48	49	20	51	52	53	54
12548	T (°C)	12 C. 15. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10	1.68 2.68 1/4	34	4.50	1.22	23.6/	10.00	42.66			
	Hd		75	<b>i</b>		4'£		44	4,4			
	DO (mg/L)		2,0			3.7		2.4	2.4.3.6			
	Conductivity	×	×		×	×	×	×	358	×		×
12550	(°C)		-					  - 				
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
12551	T (°C)											
	Hď											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
12552	T (°C)				į							
	Hd		43									
	DO (mg/L)		44									
	Conductivity	×	×'\'\'\'\'\'\'\'\'\'\'\'\'\'\'\'\'\'\'\		×	×	×	×	×	×		×
	Init./Date (1999):	<del>13</del> %	12/2	12/4	12.55	12/6n	139m	17/8	13%	12/10	12/11	12/12

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness at end of test for any samples. (\*) bid an extra manival renewal 69:30 1218 Am 13:30 JM 178 Review: Date: 12/2(1997) Ctenychr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

						Day	Day of Analysis	ysis					
Sample	Parameter	44	45	46	47	48	49	20	51	52	53	54	
12592	T (°C)												
	Hd		7.3			7.4							
	DO (mg/L)		49			3.9							
	Conductivity Aww. / P+H	×	×		×	38	×	×	×	×		×	
12593	T (°C)						<u> </u> 						
	Hd		7.3			7.4	4						
	DO (mg/L)		7,0			4							
	Conductivity	×	×		×	×		×	×	×		×	
12609	τ (°C)									22.7	227325		<u>-</u>
	Hd		43			7.4		44		7.3	<b>├</b>		1
	DO (mg/L)		0,			4		6.5		4.6			$\omega_{\tilde{j}}$
	Conductivity	×	×		×	×	×	×	×	×	38	*	360
	T (°C)												A THAN
	Нф												•
	DO (mg/L)												
	Conductivity	×	×		×	×	×	×	×	×		×	
	Init./Date (1999):	12/2	13/3-	42/4	12,53	12%	13/A	17,78	12/8	12/19	12/12/2	12/12	13/13 JG

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness at end of test for any samples.

Date. 14/21/99

Review: Date: 17/21/59 clenvchr.doc Date: 18/21/59 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

# Midge (Chironomus tentans) Chronic Toxicity Test Day 20 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc. Project: 99033 Dead Creek BTR: 3529 Test Start: October 20, 1999 Day 20: November 9, 1999 Ashed Larvae Ashed Pan and 11/8/99 Pan Wt. Ashed preserve Crucible Initial # d? Ashed + Larval Larval Sample Repl. Larvae # Alive Init. # Y/N Weighed Pan Wt. Wt. Dry Wt. 12611 OP OL 12 M Υ 12 J OPOL TmK 12 OPOL X TM 12 L OPOL 1 Tm 10P OL 12612 12 TM J 12 m OP OL OP OL K 12 7M 12 12613 12 TmJ 12 TM 12 K OP OL TM 12 M 12614 12 OPOL TM 12 m OP OL K OP 3L 12 2251.81 2,238,97 TM2,240,30 L 12 M 196L 12622 12 2 7m 211297 2,139,9012,123,57 12 J TM Y 2,396,642,387,54 1P3L 3 12 Y K aP5L TM 2, 286.58 2,303,402,289.39 4 12 13,313,25 2,322,182,315,19 L apail TM

Date / Time / Init. Larvae in oven: 11/26 16,45	Date / Time / Init. Larvae out of oven: 11/27 15:00 -16
Date / Time / Init. Larvae in furnace: 11/27 13	Date / Time / Init. Larvae out of furnace:
Balance QC: Initial (20 mg = 2coc, 0 4) F	Final (20 mg = \$100.06 ) Balance Asset #:
Date/time In 11/26 √ Temp(°C) So Init. ≤	Date/time out 11/27; Jemp(°C) 90° Init.
/ \t'.	
Comments	

Comments:

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99 Sample / Repl. Response 21 22 23 24 25 26 27 28 29 31 30 # Males 12611 A emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12611 B emerged Male Time to Mortality (days) # Females Females Time to Mortality (days) Cumulative number emerged # Egg Case # Eggs / Time to hatch / # hatched 12611 C Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

11/14

11/15

11/16

11/17

11/18

11/19

11/13

Review: Date: 12/21/95
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

11/10

11/11

11/12

Init./Date

(1999)

ctdays21-31

11/20

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12611 D	# Males emerged			<del> </del>			<del> </del>					
		<u> </u>	<del> </del>	<del></del>	<b> </b>	<del> </del>	ļ	ļ	<b>!</b>	<b></b>	ļ	ļ
	Male Time to Mortality	i	1			1	1				1	
	(days)			<u> </u>		<u> </u>			<u> </u>			
	# Females		]	]	1				]			
	emerged	)	}	1	}		ļ	1	ŀ		}	ł
	Females			<del> </del>	<del> </del>	<b></b>	<del>                                     </del>		<del></del>			
	Time to Mortality			1	Í	[		1	İ	l	Ì	
	(days) Cumulative	<del> </del>	<del></del>	<del></del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>
	number	}	Ì	İ	}	1		}		}	}	
	emerged		ļ		<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		ļ
	# Pairings							}				
	# Egg Case			<del> </del>		1						
	# Eggs / Time to hatch /		1	1	ĺ	1	l		1			l
	# hatched		1	ļ	•		1		ļ		İ	1
12611 E	# Males emerged											
	Male Time to		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<u> </u>		
	Mortality		l	1	{	ł	l	<u> </u>			ļ	
	(days) # Females		<del> </del>	<del> </del>	<del> </del>	<del>}</del> -	<del></del>	<del> </del>	ļ	<del> </del>	ļ	<del> </del>
	# remales emerged					}		}	}			}
	Females		<del>                                     </del>	1	<del>                                     </del>	<u> </u>						
	Time to Mortality (days)		}	}		ļ	}	]	j	]	)	}
	Cumulative		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	}	<del> </del>	<del> </del>	<del> </del>
	number emerged											
	# Pairings									j		
	# Egg Case	<del></del>										
	<del></del>		<del> </del>	ļ		ļ	ļ		<b> </b>			
	# Eggs / Time to hatch /			1	ĺ	İ		l		i	ł	
	# hatched			}	Ì	ł			ŀ		ł	}
12611 F	# Males											
120117	emerged				j		l		ļ			1
	Male Time to		<del> </del>	<del> </del> -	<del> </del>	<del> </del>		<del> </del>	<del> </del>			<del> </del>
	Mortality (		ĺ	-	l	İ	1	1	}		<b>!</b>	1
	(days)		<del> </del>	ļ	ļ	<del> </del>	<del> </del>	<del> </del>	<b> </b>	ļ	<b></b>	<u> </u>
	# Females emerged			}		}						i
	Females		<del> </del>	<del> </del>	<del>}</del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del> -
	Time to Mortality		ł	ł	ļ			]		}	}	
	(days)		<del>  </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<b></b>	<u> </u>	<b></b> -
	Cumulative number		}			1				[	{	
	emerged				[	L			L			
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch /		<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>	
Ţ	Time to hatch /			1	1	}	}	}	1	1	ł	
	# hatched				<u></u> _	<u> </u>		1	<u> </u>	1		
		11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date: 12/21/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12611 G	# Males emerged			-	1		<del> </del>	<del> </del>	<del> </del>			
	Male Time to Mortality (days)								1			<del> </del>
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched								<del> </del>	<del> </del>		
12611 H	# Males emerged											
	Male Time to Mortality (days)	- <del>-</del>							<del> </del>			
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched				<del> </del>				<del> </del>			
	init./Date (1999)	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/2

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Comments:		
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Review: \_\_\_\_\_ Date: /2/2//99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

 Project: 99033 M-C Dead Creek
 BTR: 3629
 Test Start: 10/20/99

 Sample / Repl.
 Response
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42

Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12611 A	# Males emerged								<del> </del>		-	
ه میں	Male Time to		+	+	+	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del> -	<del> </del>	<del> </del>
	Mortality			ļ	-			{	İ		ł	
	(days) # Females		<del> </del>	-	<del> </del>	<del> </del>	<del> </del>	<del></del>	<del> </del> -	<del> </del>		ļ
	emerged				}		}			1		}
	Females		<del> </del>	<del>†                                      </del>	+	<del> </del>	<del> </del>	<del> </del>		<del>                                     </del>		<del> </del>
	Time to Mortality	l			ĺ				1			
	(days) Cumulative		<del> </del>		<del></del>	<del> </del>	<del></del>	<del> </del>	<del> </del>	<del> </del>	ļ	
	number		-			1	İ	ł				1
	emerged	<del></del>	<del> </del>		<del> </del>		<del> </del>	ļ	<del> </del>		1	
	# Pairings											
	# Egg Case											
	# Eggs /		<del> </del>	<del></del>	<del></del>	<del> </del>	}	<del></del>	<del>}</del>	<del> </del>	<del> </del>	<del> </del>
	Time to hatch /				1						İ	İ
	# hatched				1	<u> </u>			<u> </u>	<u> </u>		
12611 B	# Males emerged											}
	Male Time to		Ť T	1	1		1	† — — — — — — — — — — — — — — — — — — —			<del>                                     </del>	
	Mortality (days)						ĺ	1	1	1		
	# Females		<del>†</del>	<del> </del>	<del> </del>	<del> </del>	<del>                                     </del>	<del> </del> -	<del> </del>	<del> </del>	<del>                                     </del>	<del> </del>
	emerged										i I	
	Females		<del> </del>	<del> </del>	<del> </del>	-	<del> </del>	<del> </del>	<u> </u>	<del> </del>	<del> </del>	
	Time to Monality				1	ŀ			1	ľ		1
	(days) Cumulative		<del> </del>	<del> </del>	<del> </del>	<del>}</del>	1	<del> </del>	<del> </del>	<del> </del>	<u> </u>	1
	number				1					1		ł
	emerged		ļ	ļ		ļ	<u> </u>		ļ	ļ		
	# Pairings											
	# Egg Case											
	# Eggs /		<del> </del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del>	<del></del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del>
	Time to hatch /		İ					-				
	# hatched		-	<del> </del>	<del> </del>	<del> </del>	<del>                                     </del>				<u> </u>	<u> </u>
12611 C	# Males emerged		\			}	}	Í	}	1	1	1
	<u> </u>		ļ		ļ	ļ	ļ	<u> </u>		ļ	<u> </u>	
	Maie Time to Mortality		1			1	1	1				1
	(days)					ŀ	1	ł				İ
	# Females emerged											
	Females		<del></del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del></del>	-	<u> </u>
	Time to Mortality		1					i				
	(days)				<u> </u>		1	<u> </u>	1	<u> </u>		
	Cumulative											
	number emerged		1	1		1		Ĭ	1			1
	# Pairings				†		1	<del> </del>				
	# Canaligs			ļ	<u> </u>	ļ	<u> </u>		<u> </u>	<u> </u>	<u> </u>	<u> </u>
	# Egg Case											
	# Eggs / Time to hatch /				<del>                                     </del>							
	# hatched				<u> </u>							
										1	1	1
	Init./Date	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

ctdays32-42

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Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	252	233	234	24	25	-28	-233	28	29	<del>30</del> 41	李
12611 D	# Males emerged				./2							
	Male Time to	<del> </del> -		<del> </del>	<del> </del>	<del> </del>	<del> </del>			<del></del>	<del> </del> -	<del> </del>
	Mortality	ļ	1				j		j		<u> </u>	
	(days)				ļ <u>.</u>	<u> </u>			<u> </u>			<u> </u>
	# Females emerged											
	Females Time to Monality							<del> </del>				
	(days)				ļ	ļ				1		
	number	Ì	ļ		Ĭ						1	1
	emerged						-	-	<u> </u>			-
	# Pairings											
	# Egg Case											
	# Eggs /		<del> </del>		<del> </del> -	ļ		<del> </del>	<u> </u>			<del> </del>
	Time to hatch /				[						1	
	# hatched						<del> </del>	<u> </u>				ļ
12611 E	# Males emerged											
	Male Time to Mortality											
	(days)				l		<u> </u>					
	# Females emerged					al .				}		
	Females Time to Mortality						l		<u></u>			
	(days)						L	ļ	<u> </u>			<u> </u>
	Cumulative number					1						T
	emerged											<u> </u>
	# Pairings											
	# Egg Case											
	# Eggs /						<del> </del> -	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Time to hatch /				1	[		ľ		1		Ĭ
	# hatched										ļ	<u> </u>
12611 F	# Males emerged			,	!					<u> </u> 		
	Male Time to Mortality											<del>                                     </del>
	(days)											
	# Females emerged								1			
	Females					<u> </u>			<u> </u>		<del> </del>	ļ
	Time to Mortality (days)								l			
	Cumulative				<del>                                     </del>	<del> </del>	<del></del>	<del> </del>	<del> </del>	·	<del> </del>	<del>                                     </del>
	number			ĺ	(	İ	1		į		(	1
	emerged				<del>                                     </del>		<del>                                     </del>	<del>                                     </del>	<del>                                     </del>	<del> </del>	<del> </del> -	<del> </del>
	# Pairings								_			
	# Egg Case											
	# Eggs /	<del></del>			<del> </del>	<del> </del>	<del> </del>	<del> </del>	1	<del> </del>	<del> </del>	<del> </del>
	Time to hatch / # hatched				-			[				
<del></del>	Init./Date (1999)	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Correction

Review: Date: 12/21/55

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Mai Mai Mai Mai Mai Mai Mai Mai Mai Mai	Males merged e Time to fortality (days) emales merged	21 37	22 - 33	-25 -34	24	+	1					
Mai Mai Mai Mai Mai Mai Mai Mai Mai Mai	merged e Time to fortality (days) emales		<u> </u>	1		25 36	26 37	27 38	28 39	200	30	42
#F	tortality (days) emales											
#F	(days) emales		1			1						
e					<u> </u>	<u> </u>						
F												
Time	emales to Mortality (days)											
Cu	mulative		<del>                                     </del>	<del>                                     </del>	<del> </del>	<del> </del>	<del>                                     </del>	<del>                                     </del>	<del> </del>	<del> </del>		<b> </b>
	nerged merged		<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>			ļ	· · · · · · · · · · · · · · · · · · ·	
#	Pairings					_			}			
# E	gg Case											
	Eggs / to hatch /			<del>                                     </del>	<del>                                     </del>	<del> </del>		· ·				
#1	natched						<u> </u>	<u> </u>	Ĺ	<u></u>		
	Males nerged										-	
M	e Time to lortality (days)											
# F	emales nerged									1		
Time	emales to Mortality days)									5d12/4		
Cui	mulative		ļ	<del> </del>	<del> </del>	<del> </del>	<del> </del>	†		<del> </del>		1
	nerged		ļ	<u></u>	<del> </del>	<del> </del>		<b></b>	ļ	ļ		<u> </u>
# 1	Pairings						<u> </u>					
# E	gg Case											
	Eggs / to hatch /		<del> </del>		<u> </u>	-		<del> </del>		<del> </del> -		
# h	natched						<u> </u>					
	/Date 999)	1/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	17/29	11/30	12/1
nergence scoring:	Record	any pu	ipae wh	ich die (	D) before	e emera	ence. D	= dead	for flies		nerge bu	it are no

Review: \_\_\_\_\_ Date: 12/21/99
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ctdays32-42

Midge (Chironomus tentans) Chronic Toxicity Test Biological Monitoring BTR: 3629 Project: 99033 M-C Dead Creek Test Start: 10/20/99 Sample / Repl. Response 43 44 45 46 47 48 49 53 50 51 52 # Males 12611 A emergea Male Time to Mortality (days) # Females 0 L emerged Females Time to Mortality (days) Cumulative emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12611 B emerged Male Time to Mortality (days) ΟL emerged Females Time to Mortality (days) 126 Cumulative number emergeo # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12611 C emerged Male Time to Mortality (days) OL

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

12/5

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n676

12/6

12/7

12/8

12/9

12/10

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12/3

12/4

emerged Females

Time to Mortality (days) Cumulative

number emerged # Pairings

# Egg Case

# Eggs / Time to hatch /

Init./Date |12/2

ctdays43-53

12/12

12/11

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12611 D	# Males emerged				-							
	Male Time to Mortality (days)				<del> </del>							
	# Females		<del> </del>	<del></del>	<del> </del>			<del> </del>	<del> </del>	<del>                                     </del>		<del> </del>
	emerged					06						
	Females Time to Mortality (days)					OP						
	Cumulative					12/1		<u> </u>	<del>                                     </del>	<del> </del>		
	number emerged					12/6-5			<u> </u>			
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12611 E	# Males emerged											
	Male Time to Mortality					<del> </del>						
	(days) # Females		<del> </del> -	<del> </del>	<del></del>	<del> </del>	<del> </del>	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	emerged					OL	<u> </u>					
	Females					4 70						
	Time to Mortality (days)					DT	ļ				1	
	Cumulative					1	i	1		Ī		
	number emerged					176JG	+					
	# Pairings					1 1 9 3	<u> </u>					
	# Egg Case											
			<u> </u>	ļ			ļ		<u> </u>	<del> </del>		<del>}</del>
	# Eggs / Time to hatch /										}	
	# hatched			<u> </u>								<u> </u>
12611 F	# Males emerged								-			
	Male Time to Mortality					1.						
	(days) # Femaies		<del> </del> -	<del> </del>		la i			<del> </del>	<del> </del>		ļ
	emerged					7						
	Females Time to Monality (days)					OP						
	Cumulative		<u> </u>	+	†	1-1,	<del> </del>	<del>                                     </del>	+	<del>†                                      </del>	<del> </del>	<del>                                     </del>
	number emerged		<u> </u>	<u> </u>	ļ	12/646	<u> </u>	<u> </u>			ļ	
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch /				1			-				
	# hatched	10/0	10/0	10/4	140/5	100	4077	14010	140'0	140/40	10/11	4014
	Init./Date (1999)	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11	12/1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa = Q

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ctdays43-53

ect: 99033 M	-C Dead Cr	еек	ВІ	R: 3629	··-	<del></del>	·	16:	st Start:	10/20/9	99	
Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12611 G	# Males emerged						<del>                                     </del>					
	Male Time to Mortality (days)											
	# Females emerged					06						
	Females Time to Mortality (days)					OP						
	Cumulative number emerged					1264G						
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched								-			
12611 H	# Males emerged											
	Male Time to Mortality (days)								<b>†</b>			
	# Females emerged					106						
	Females Time to Mortality (days)					OP						
	Cumulative number emerged			<u> </u>	ļ	12 6 96						
	# Pairings		<u> </u>									
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11	12/1
nergence sco rviving. P = p ments:	ring: Record	d any p (V®)	upae wł	nich die (	D) befor	e emerg	ence. [	) = dead	for flies	which er	merge bi	ut are

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Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12612 A	# Maies emerged											
	Male Time to	<u> </u>		<del> </del>	<del> </del>	<del> </del>	<del> </del>		†	<del> </del>	<del>                                     </del>	<del> </del>
	Mortality (days)	1	Ĭ	İ			ĺ	ļ		ŀ		
	# Females	<del></del>	<del> </del>	<del>\</del>		<del> </del>		<del> </del>	<u> </u>		<del> </del>	<del> </del>
	emerged	}			1	]	]	}			}	
	Females		<del> </del>	+	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<u> </u>	<del> </del>		<del> </del>
	Time to Mortality					1	ļ	Í	Í	ĺ	1	Į.
	(days) Cumulative		<del></del>	+	<del> </del>	<del>├</del>	ļ. ———	<del> </del>		<del> </del>	<del> </del>	<del> </del> -
<del> </del>	number		1	1			ļ				}	)
	emerged		<del> </del>	<del> </del>	<del>                                     </del>	<u> </u>	<del> </del>	<b> </b> -		<del> </del>	<u> </u>	<del> </del>
	# Pairings											
	# Egg Case											
	# Foos /		<del> </del>	<del>                                     </del>	<del> </del>	<del> </del> -	ļ.———·	<del>}</del>	<del> </del>		<del> </del>	┼
	# Eggs / Time to hatch /			1			[			1	1	
	# hatched						<u></u>					Ĺ
12612 B	# Maies emerged											
	Male Time to				<del>                                     </del>					1		
	Mortality (days)		1	1	]	ļ			}		}	
	# Females		<del> </del>	<del>                                     </del>	<del> </del>	<del> </del>			<del> </del>	<del>                                     </del>	<u> </u>	<del>                                     </del>
	emerged					•	1	l			1	
	Females		<del> </del>	<del> </del>	<del>                                      </del>	<del> </del>			<del>}</del> _	<del> </del>	<del> </del> -	<del></del>
	Time to Mortality					1		]		j	}	}
	(days) Cumulative		<del> </del>		<del> </del>	<del> </del>	<del></del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>
	number		1	ĺ	ĺ		ĺ	Ì		Í	1	Ì
	emerged		<del> </del>	<del> </del>	<del> </del>	<b></b> _		ļ	<del> </del>		<del> </del>	<del> </del>
	# Pairings					}						
	# Egg Case											
						ļ					ļ <u>.</u>	<u> </u>
	# Eggs / Time to hatch /						1	[		ĺ		1
	# hatched		ļ								L	<u> </u>
12612 C	# Males							ļ				
.20.20	emerged		l		<u></u>	j		İ	j		l	<u> </u>
	Male Time to											
	Mortality (davs)		1		1					ļ		<b>\</b>
	# Females emerged											
	Females		<del> </del>					<del> </del>		-	<del> </del>	<del> </del>
	Time to Mortality			ĺ					ļ		i	ļ
	(days) Cumulative		<del></del>	<del> </del>	<del> </del>	<u> </u>	<del> </del>	<del></del>	<del> </del>	<del></del>	<del> </del>	<del> </del>
	number		1	ļ	i	ļ	1	1		]	}	]
	emerged		<del> </del> -			<del> </del>		<del> </del>	<del> </del>		<del> </del>	<del> </del>
	# Pairings				ļ	_						
	# Egg Case											
	# Eggs /		-					<del> </del>	<del> </del>		<del> </del>	
	Time to hatch / # hatched									<u> </u>	<u> </u>	
	Init./Date	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20
	(1999)		l .	<b>\</b>	l .	1		}	i	1	ļ	1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

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Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12612 D	# Males		+			<u> </u>					<u> </u>	
	emerged	<u> </u>	<del> </del>		<del> </del>	<u> </u>	<del> </del>	ļ	ļ	<u> </u>	<u> </u>	ļ
	Male Time to Mortality (days)		}									
	# Females emerged											
	Females Time to Mortality		<del>                                     </del>	<del>                                     </del>		<del> </del>	<del></del>	<del> </del>				<del>                                     </del>
	(days) Cumulative	<del></del>	<del> </del>	<del> </del>	<del> </del>	<b>_</b>	<del> </del>	<del> </del>	<del> </del> -	<del> </del>	<del> </del>	<del></del>
	number emerged											
	# Pairings											
	# Egg Case											
	#Eggs / Time to hatch /					<del> </del>		-				1
12612 E	# hatched # Males emerged		ļ		}	<u> </u>		<del> </del>				<del> </del>
	Male Time to Mortality	<u> </u>	<del> </del>			<del> </del> -	<del> </del>	<del> </del> -		<del> </del>	<del> </del>	<del> </del> -
	(days) # Females		<del> </del>		<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>
	emerged		<u> </u>		ļ <u></u>	ļ	ļ	ļ	ļ		ļ	ļ
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12612 F	# Males emerged											
	Male Time to Mortality											
	# Females emerged		<del>                                     </del>		<del>                                     </del>			<u> </u>		<del>                                     </del>		<del> </del>
	Females Time to Mortality (days)							<del> </del>				
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
74	المنافعة المستحدث	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date: 12 11 | 49
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Sample / Repl.	1 5	<del></del>				<del></del>					<del></del>	
	Response	21	22	23	24	25	26	27	28	29	30	31
12612 G	# Males emerged											
	Male Time to	<del> </del>	+	┪	<del></del>	<del> </del> -	<del> </del>	<del></del>	<del> </del>		<del> </del>	<del> </del>
	Mortality	1	1		i .	}		1	1	l	1	
	(days) # Females	<del> </del> -	<del> </del>	<del></del>	<del> </del>	<del> </del>	<del> </del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del>	<del> </del> -
	emerged					-			}			
	Females Time to Mortality			-	T							
	(days)		<u> L</u>			<u> </u>	<u> </u>		<u> </u>			J
	Cumulative number	}		1		_						
	emerged	<u> </u>	<u> </u>	J	<u> </u>		1		<u> </u>	<u> </u>		<u> </u>
	# Pairings											
	# Egg Case				<del></del>	<del></del>						
	# Eggs /	<u> </u>	<u> </u>	<u> </u>	<u> </u>					ļ	ļ	<b> </b>
	Time to hatch / # natched									}		1
12612 H	# Males emerged						1					11
	Male Time to				11	<del> </del>	1.1		<del> </del>		<del> </del>	128
	Mortality (days)	1	1	1	50/1/18	1	(00,121			ĺ	1	11/26
	(days) # Females	<del> </del>		<del> </del>	+	<del> </del>	1.10		adead	<del></del>	<del> </del>	1-/
	emerged			<u> </u>					۱ م			
	Females Time to Mortality (days)	}		}		}		}	00 00 m	)		
	Cumulative			1	1				1	i ———	1	
	number emerged		1		'	,	1 4		17			
	# Pairings											
	# Egg Case			<del> </del>							<del> </del>	<del>                                     </del>
	# Eggs /			<del> </del>		ļ					<del> </del>	-
	Time to hatch / # hatched						<u> </u>	i 	1			
			11/11	11/12	11413	11/14	11/25	44/40	146	11/18	11/19	11/20

Review:	Date:	12/21	199	
Laboratory: Aqual	ec Biologica	al Science	s. South Burli	naton. Vermoni



Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12612 A	# Males emerged		<del>                                     </del>									
	Male Time to		<del></del>	<del> </del>	<del> </del>	<del> </del>		<del> </del> -	<del></del>	<del></del>		<del> </del>
	Mortality		1	1			) 		i	1		
	(days)		<del> </del>	ļ	<del> </del>		<del></del> -			<del> </del>		<b> </b>
	# Females emerged					1		ł		1		}
	Females		<del></del>		-	<del> </del>		<del> </del>		<del></del>	<del></del>	<del> </del>
	Time to Mortality		1						1	OL		1
	(days) Cumulative		<del></del>	<del>                                     </del>	<del> </del>	ļ	<del> </del>	<del> </del>		100	<b></b>	<del> </del>
	number			1	1			}		OP	ł	ł
	emerged		ļ <u> </u>	<u> </u>	ļ			ļ				
	# Pairings					İ				11/29m		
	# Egg Case											
	# Eggs /		1							ļ		
	Time to hatch /							}				
	# hatched		<del></del>		-		ļ	<del> </del>		<del> </del>		<del>}</del>
12612 B	# Males emerged					<u> </u> 						
	Male Time to		<del>                                     </del>	<del> </del>			<del> </del> -	<del> </del> -		<del> </del>		<del> </del>
	Mortality											ļ
	(days) # Females		<del> </del>	ļ	<del> </del>		<del> </del>	<del> </del> -	ļ	<del> </del>	ļ	<del> </del>
	emerged									ÔL	İ	
	Females		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	100	<del> </del>	<del> </del> -
	Time to Mortality		1	į			į			178		1
	(days)		<del> </del>	<del> </del>	ļ	<u> </u>	ļ	<del> </del> -		101		ļ
	Cumulative number		1	}	ļ	}	j		ļ	11/292	]	}
	emerged				ļ	<u> </u>				1,1212		ļ
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched									-		
40040.0	# Males		<u> </u>	<del> </del>	<del> </del>		<del> </del>		<u></u>	<del> </del>	<del> </del>	
12612 C	emerged							}	ļ		}	
	Male Time to Montality (days)											
	# Females emerged									OL		
	Females		<del> </del>		<del> </del>	<del></del>	<del> </del>	<del> </del>	<del> </del>		-	
	Time to Mortality									OP		
	(days) Cumulative		<del> </del>	<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>			
	number					1	1			11/39	1	
	emerged		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	1111	<del>}</del>	<del> </del> -
	# Pairings							1				ł
	# Egg Case											
	# Eggs /	<del> </del>	<del> </del>	<del> </del>	ļ <u>-</u>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	+	<del> </del>	
	Time to hatch / # hatched											
		11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1
	(1999)		1	1	1	}	[	1	1	1	1	İ

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa  $\int z \left( \frac{2}{2} \right) dz$ 

Review: Date: 12/21/49
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays32-42

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	21/32	227	234	24	25	<del>26</del> <del>37</del>	27	28	20	30	都
40040.5	# Males	- 52	13	34	35	136	31	133	57	40	TI	40
12612 D	# Males emerged						-					}
	Male Time to					·	f	1	<del></del>			<del> </del>
	Mortality (days)						ļ	İ		1		ļ
	# Females						<u> </u>			(-1		
	emerged									0,0		
•	Females Time to Mortality									7		
	(days)						İ			01,9		<u> </u>
	Cumulative number		`				{			17		
	emerged									19		ļ
	# Pairings	İ				}	}					
	# Egg Case											
	# Eggs /							ļ				
	Time to hatch / # hatched						ĺ					1
12612 E	# Males		·									1
12012	emerged											<u> </u>
	Male Time to Mortality											
	(days)											
	# Females emerged								_	01		
	Females							<del> </del>		00		<del> </del>
	Time to Mortality (days)									IOP 1		
	Cumulative							1		1129		
	number emerged									1129		_
	# Pairings				1							
	# Egg Case											
	# Eggs /											<del> </del>
	Time to hatch / # hatched	i i				:				1		
12612 F	# Males emerged				· · · · · · · · · · · · · · · · · · ·							
	Male Time to							ļ		<u> </u>		ļ
	Mortality (days)	}										
	# Females									Δ.		1
	emerged						{			IUL 1		
	Females Time to Mortality					-				00		
	(days)							1		UL		<u> </u>
•	Cumulative									11)29		
	emerged						<u> </u>	ļ		1.1.JW	<u> </u>	<del> </del>
	# Pairings	ļ										
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1

		1999]	<u></u>					_i
	Emergence scoring:	Record any p					ich emerge b	ut are not
	-	_	S	urviving. P = pu	pa L= (200	<b>'</b> S		
Re	view: Da boratory: Aquatec Biolo	te: $12/2/9$	) Test	Day Co	MECAU	071/3	3 / 29 ctd	lays32-42
La	boratory: Aquatec Biolo	gical Sciences, S	outh Burlington, '	Vermont				

Sample / Repl.	Response	24	<del></del>	- 22	7 24	25	20-	27-	22	200	20-	2
	response	-432	37	-23 -34	35	25	<del>26</del> 77	39	38	<del>29</del>	200	-34 4
12612 G	# Males emerged										-	
	Male Time to Mortality (days)	Ì										
	# Females emerged									DE		
	Females Time to Mortality (days)									OY		
	Cumulative number emerged									11/3		
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12612 H	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged									OL		
	Females Time to Mortality (days)									109		
	Cumulative number emerged									11/39		
	# Pairings									1		
	# Egg Case											
	# Eggs / Time to hatch / # hatched							-				<del> </del>
		11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1
mergence sco				ch die (l	D) before	emerge	ence. D	= dead	for flies	which er	nerge bu	it are
irviving. P≃ p iments:	oupa (=	1 arva	·						<del></del>			
monto.	(1:	) 7	-55	Der	<i>C</i> 3	reco	'ò~ (	J. 11	156/9	7		
		<del></del>	<del></del>					·				
			<del></del>									
	<del></del>											

Review: \_\_\_\_\_\_ Date: 12/2 / 9 Q
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays32-42

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99 Sample / Repl. Response 21 22 23 24 25 26 27 28 29 30 31 # Males 12613 A emerged Male Time to (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12613 B emerged Male Time to 30/1/4 Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12613 C emerged 119<sup>11</sup>11 Male Time to 40,1/18 40,000,00 Mortality (days) # Females emerged Females Adulis 30/19 Time to Mortality (days) Cumulative number œ emerged Fa.1038 # Pairings **1**893 # Egg Case 43 unhutched # Eggs / Time to hatch / y5000 llaz # hatched 1414 1388 1145 11/26 11/12 11/13 Init./Date 1///19 (1999)Emergence scoring: Record any purpae which die (D) before emergence. D = dead for flies which emerge but are not @ Correction

surviving. P = pupa

Review: \_\_\_\_ Date: (2/2) (27)
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12613 D	# Males emerged					-	-					
	Male Time to	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Mortality (days)							ļ			1	
	# Females		<del>                                     </del>	+	<del> </del>	<del> </del>	<del> </del>	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	emerged		1	}		1		}	}	}		j
	Females Time to Mortality					ļ		· · · · · ·				
	(days)			Ļ		Ĺ	<u> </u>					1
	Cumulative number											
	emerged			<u> </u>				<u> </u>		<u> </u>	<u> </u>	<u> </u>
	# Pairings				t .				}			
	# Egg Case						<del> </del>				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
	# Eggs /	ļ	ļ	<del> </del>	<u> </u>	<del> </del>	<del> </del>	<u> </u>		ļ		<u> </u>
	Time to hatch /				ľ							
40040 E	# hatched # Males	-	┼	<del> </del>	<del> </del>		<del> </del>			<del> </del>		
12613 E	emerged				ļ	}			]	j		
	Male Time to		1	<del>                                     </del>	<del> </del>	<del> </del>	<del>                                     </del>		<u> </u>			<del> </del>
	Mortality (days)	ļ				1					[	
	# Females			T	1			<u> </u>		1		T
	emerged			1		L		ļ	1			
	Females Time to Mortality			T								
	(days)		<u> </u>			<u> </u>			l			
	Cumulative number											
	emerged		<u> </u>	ļ <u>.</u>	ļ <u> </u>	<u> </u>	ļ	<u> </u>		<u> </u>		ļ
	# Pairings											
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	Time to hatch / # hatched							<u> </u>			<u></u>	
12613 F	# Males emerged					]			Ī			
	Male Time to		<del>ļ.</del>	ļ	<b>}</b>	<del> </del>	<del> </del>	ļ	<del>}</del>	<del> </del>	}	
	Mortality				1	ŀ			ļ			
	(days) # Females		<del></del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	
	emerged		}		1				}			
	Females		<del> </del>	<del> </del>	<del> </del>		<del> </del> -	<del> </del>				<del> </del>
	Time to Mortality (days)				İ	ŀ					1	
	Cumulative			<u> </u>			<del>                                     </del>		ļ			
	number emerged		1			1						
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	# Eggs /		<del> </del>	<del> </del>	<del> </del>	<del> </del>			<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Time to hatch / # hatched											
	Init./Date (1999)	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/2/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ect: 99033 M	-C Dead Cr	eek	BTI	R: 3629	·			Tes	st Start:	10/20/9	99	
Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12613 G	# Males emerged				-						1	
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings				<u> </u>							
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12613 H	# Males emerged											
	Male Time to Mortality (days)											
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	Females Time to Mortality (days)											
	Cumulative number emerged				ļ	ļ	ļ		ļ		<u> </u>	
	# Pairings			<u> </u>	ļ						-	<u> </u>
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20
nergence scor rviving. P = p ments:	ing: Record	d any po	upae wh	ich die (	D) befor	e emerg	ence. D	) = dead	for flies	which e	merge bu	ut are n
							<del></del>					

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		12/21	100	
Review:	Date:	10/21	[77	
Laboratory: Aquated	Biologic	al Science	s, South Burli	ngton, Vermont

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

12613 A	Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
Morality (0942)   Females   OL	12613 A			1									
( (ays)				<del></del>	†	<del>:</del>	<del></del>	<del> </del> -	<del></del>	<del>                                     </del>	-	<del>                                     </del>	+
# Femiles						}						}	
Temalise   Temalise		# Females		+	1	<u> </u>	<del> </del>		<del>                                     </del>		<del> </del>	<del> </del>	
Time to Mortality   Commission   Commissio				<u> </u>	<u> </u>	<u></u>					OL		
Cumulative member mem											$\Delta p$		
### ##################################		(days)		J	1	<u> </u>		<u> </u>	L		UP		
# Parings  # Eggs / Time to hatch / # hatched  # Eggs / Time to hatch / # hatched  # Eggs / Time to hatch / # hatched  # Male Time to Morally (Gays)  # Eggs / Time to Morally (Gays)  # Eggs / Time to Morally (Gays)  # Egg Case  # Eggs / Time to Morally (Gays)  # Egg Case  # Eggs / Time to Morally (Gays)  # Egg Case  # Eggs / Time to Morally (Gays)  # Egg Case  # Eggs / Time to Morally (Gays)  # Egg Case  # Eggs / Time to Morally (Gays)  # Egg Case  # Eggs / Time to hatch / # hatched  # Eggs / Time to hatch / # hatched					Ì				1		11/39		
# Eggs				-	ļ			ļ			1,214		ļ
# Eggs / Fine to hatch / # Fine to hatch / # Fine to hatch / # Fine to hatch / # Fine to hatch / # Fine to Morally (days) # Females emerged		# Pairings											
Time to hatch/		# Egg Case											
Time to hatch/ # statched  # Males emerged  Male Time to (days)  # Fernales emerged  Fernales (Time to Mortality (days)  # Egg Case  # Eggs / Time to hatch / # hatched  # Fernales emerged  # Parings  # Eggs / Time to hatch / # statched  # Fernales # Fernales  # Eggs /  # Eggs /  # Eggs /  # Eggs /  # Eggs /  # Fernales # Fernales # Fernales # Fernales # # Males # Males # Males # Males # Males # Males # Males # Males # Males # Males # Eggs /  # Fernales # Fer		# Eggs /		1		<u> </u>	-			<u> </u>			┼
12613 B		Time to hatch /											
Male Time to   Mortality   (days)   # Females   emerged	12613 B	# Males		1		İ				<u> </u>			
Mortality (days)					<u> </u>	·							<u> </u>
# Females   Females   Comment   Comm		Mortality											
Females Time to Mortality (clays)  Cumulative number emerged  # Eggs / Time to hatch / # hatched  12613 C  # Males emerged  Male Time to Mortality (clays)  # Females Time to Mortality (clays)  # Females Time to Mortality (clays)  # Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  # Egg Case  # Egg Case  # Egg Case				<del> </del>		<u>;</u>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	101	<del> </del>	-
Cumulative number emerged # Pairings # Eggs / Time to hatch / # hatched # Females emerged # Females Time to Mortality ((days) # Females emerged emerged emerged # Pairings # Eggs / Time to Mortality ((days) # Females Time to Mortality ((days) # Females Time to Mortality ((days) # Females Time to Mortality ((days) # Females Time to Mortality ((days) # Females Time to Mortality ((days) # Females Time to Mortality ((days) # Time to Mortality ((days) # Time to Mortality ((days) # Time to Mortality ((days) # Time to Mortality # Mortal		emerged		]	į				1	1	1UL	1	
Cumulative number emerged # Parings # Egg Case # Egg Case # Egg Case # Egg Case # Egg Case # Egg Case # Eggs / Time to hatch / # hatched # Male Time to Mortality (days) # Females emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Emerged # Eggs / Time to Mortality (days) # Egg Case # Egg Case # Eggs / Time to hatch / # hatched # Egg / Time to hatch / # hatched # Egg / Time to hatch / # hatched # Egg / Time in hatched #		Females			<del> </del>	<u> </u>	<del> </del>	<del> </del>		<u> </u>	20		
# Egg Case  # Egg S / Time to hatch / # hatched  12613 C  # Males emerged  Male Time to Mortality (days)  # Females emerged  Females Time to Montality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  * Egg Case  * Egg Case  * Egg Case				}	i	1					101	}	1
# Egg Case  # Egg S / Time to hatch / # hatched  12613 C  # Males emerged  Male Time to Mortality (days)  # Females emerged  Females Time to Montality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  * Egg Case  * Egg Case  * Egg Case		Cumulative			1	i	i ·		ļ	<u> </u>	Wea		<del> </del>
# Egg Case  # Egg S / Time to hatch / # hatched  12613 C  # Males emerged  Male Time to Mortality (days)  # Females emerged  Females Time to Montality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  * Egg Case  * Egg Case  * Egg Case						<u> </u>					11/1/1		
# Eggs / Time to hatch / # hatched # Pairings # Eggs / # Eggs / Time to hatch / # hatched # Eggs / Time to hatch / # hatched #		# Pairings											
Time to hatch / # hatched  12613 C # Males emerged  Male Time to Mortality (days)  # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  # Eggs / Time to hatch / # hatched		# Egg Case											
# Egg Case    Time to hatch / # hatched		# Eggs /		<del> </del>	<del> </del>	<u> </u>	<del> </del>	ļ	<u> </u>		<del> </del>	ļ	ļ
Male Time to Montality (days)  # Females emerged  Females Time to Montality (days)  Cumulative number emerged  # Pairings  # Eggs / Time to hatch / # hatched		Time to hatch /	_									·	
Male Time to Montality (days)  # Females emerged  Females Time to Montality (days)  Cumulative number emerged  # Pairings  # Eggs / Time to hatch / # hatched	12613 C												
Mortality (days)  # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Eggs / Time to hatch / # hatched		L			<del> </del>	ļ		ļ		ļ <u>.</u>		<del> </del>	<del> </del>
# Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  # Eggs / Time to hatch / # hatched									}		1	ļ	
Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Eggs / Time to hatch / # hatched				<u> </u>	<u> </u>	ļ <u> </u>		ļ	ļ	ļ		ļ	ļ
Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Eggs / Time to hatch / # hatched						}	}				1	1	
# Eggs / Time to hatch / # hatched					1						1/11		<del>                                     </del>
# Egg Case  # Eggs / Time to hatch / # hatched		(days)									- '		
# Egg Case  # Eggs / Time to hatch / # hatched		Cumulative		1		ì		1		i	11124		<del> </del>
# Egg Case  # Eggs / Time to hatch / # hatched						1					1,11540		
# Egg Case  # Eggs / Time to hatch / # hatched							1	1	1		<del>                                     </del>		<b>†</b>
# Eggs / Time to hatch / # hatched		# railings											
Time to hatch / # hatched		# Egg Case					}						
# hatched		# Eggs / Time to hatch /										1	
Init./Date  11/21  11/22  11/23  11/24  11/25  11/26  11/27  11/28  11/29  11/30  1		# hatched						<u> </u>	ļ				ļ
(1999)			11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

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ctdays32-42

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

ample / Repl.	Response	21/32	-22- - 32	-23 74	-24	25 76	26 37	27	385	30	- <del>30</del>	31
12613 D	# Males emerged											
	Male Time to	<del>                                     </del>				<del> </del>		<del>                                     </del>	<u> </u>	├──	<del> </del>	<del>                                     </del>
	Mortality	1					ļ				ŀ	
	(days) # Females	<del>                                     </del>	<del>                                     </del>	<del> </del>	<del>                                     </del>		<del> </del> -	ļ		<del> </del>		<del> </del>
	emerged			]						102		
	Females	<u> </u>	<del> </del>	<u> </u>	<b></b> -	<u> </u>			<del> </del>	00	<del>                                     </del>	<del> </del>
	Time to Mortality (days)		ļ							IUP		1
	Cumulative						Ī			100		
	number emerged		ļ							11/29		
	# Pairings									1		
	# Egg Case		<u></u>									
	# Eggs / Time to hatch / # hatched											
12613 E	# Males emerged											
	Male Time to Mortality		-									
	(days) # Females						<del> </del>	<del> </del> -	<u> </u>	<del> / \                                   </del>	<del> </del>	ļ <u>.</u>
	emerged	1					1	}			1	}
	Females				l 	<del> </del>	<u> </u>	<del> </del>	1	<del>        -                              </del>	<del> </del>	
	Time to Mortality (days)	•								11/29		
	Cumulative					<del>                                     </del>						
	number emerged		!							176		
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched										<del></del>	
12613 F	# Males											
120101	emerged								<u> </u>	]	l	
	Male Time to Mortality (days)											
	# Females emerged									OV		
	Females				<del></del>	<del> </del>	<del> </del>	<del>                                     </del>	<u> </u>	1	<del> </del>	
	Time to Mortality (days)									IOI		
	Cumulative				<del></del>	<del>                                     </del>		<del>                                     </del>	İ	11.0	<del> </del>	<del> </del>
	number	[			ĺ	1	1	1		11/296	-	}
	emerged						<del> </del>	<del> </del>	<u>.                                    </u>	1170	<del> </del>	<del> </del>
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1

Sample / Repl.	Response	21	22-33	<del>23</del> 34	-24 35	25	- <del>26</del> -77	27	28 39	29 40	3 <del>0</del>	31
12613 G	# Males emerged	32	- 32	3.1	7.3		-31		-			-
	Male Time to Mortality			1					1	1		
	(days)	ļ	<u> </u>	<del> </del>	<u> </u>	<u> </u>	ļ. <u></u>	ļ	ļ	<del></del>	ļ	ļ
	# Females emerged									06		
	Females Time to Mortality (days)	<del> </del>				<del> </del>	<del> </del> -			OP		
	Cumulative number emerged									1111		
	# Pairings									3		
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12613 H	# Males emerged											
	Male Time to Mortality (days)			<del> </del>					<del>                                     </del>			
	# Females emerged		<b>†</b>							OL		<del>                                     </del>
	Females Time to Mortality (days)									OF		
	Cumulative number emerged									1/2/3		
	# Pairings		ļ			ļ <u>.</u>	ļ		<u> </u>	<u> </u>		<u> </u>
	# Egg Case											
	# Eggs / Time to hatch / # hatched	-										
	Init./Date (1999)	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1
nergence sco rviving. P = p ments:	upa [=	13x13					<del></del>			which er	nerge bi	at are
		Tos	55 D	24 (	rurre	CN V	1//	/30/9	77			
		- <u></u>		_ <del></del>			<del></del>	<del></del>	<del></del>	<del></del>		
									· <del> · · ·</del>			

Review: \_\_\_\_\_ Date: \2 \29 \64
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays32-42

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99 Sample / Repl. Response 25 27 21 22 23 24 26 28 29 30 31 # Males dead 12614 A emerged Male Time to 30/17 60 7dillig Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12614 B emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch # hatched # Males 12614 C emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched Init./Date 11/13 11/11 11/12 11/15 11/16 11/20 (1999)Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not

Ocorrection. JG1/14 Also I dead pupal found near top of 12614A

surviving. P = pupa

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Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12614 D	# Males emerged						-					
	Male Time to Mortality (days)		<del> </del>									
	# Females emerged		<del> </del>		1		<del> </del>					
	Females Time to Mortality (days)		<del> </del>								-	<del> </del>
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12614 E	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings			ļ	ļ							
	# Egg Case					ļ						
	# Eggs / Time to hatch / # hatched											
12614 F	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative riumber emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
·	Init./Date (1999)	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

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Cumulative number emerged	CL. 55050 W	-C Dead Cr	eek	BTI	R: 3629	<del></del>			Tes	st Start:	10/20/9	9	
Maile Time to	ample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
Mortality (days) # Females emerged  Fomales Time to Mortality (days) # Eggs / Time to hatch / # hatched  Male Time to Mortality (days) # Females # Eggs / Time to hatch / # hatched # Pairings  # Eggs / # Females # Males Time to Mortality (days) # Females #	12614 G					-				1			
# Females energed  Fompies Time to Mortality (days)  Cumulative energed  # Parnings  # Egg Case  # Egg Case  Male Time to Mortality (days)  # Females energed  Females energed  Females energed  Females energed  # Parnings  # Females energed  # Females energed  # Females energed  # Females energed  # Females energed  # Females energed  # Females energed  # Females energed  # Females energed  # Females energed  # Females energed  # Females Time to Mortality (days)  # Females energed  # Females Time to Mortality (days)		Mortality			<b> </b>	†				64			
Time to Mortality (days) Cumulative number emerged  # Pairings  # Egg Case  # Egg Sase  # Males emerged  Male Time to Mortality (days) # Females emerged  Females Time to Mortality (days)  # Females emerged  # Females Time to Mortality (days)  # Females emerged  # Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Egg Case  # Egg Case		# Females				<b>†</b>			Tocoped	\(\alpha \)	1		
Cumulative		Time to Mortality									20,00		40,1/24
# Egg / Time to hatch / # hatched		Cumulative number								2			13
# Egg / Time to hatch / # hatched # Hatched # Males emerged # Egg / Gays		# Pairings									16/43/		811/146
Time to hatch / # hatched   # Males   # Males   # Males   # Males   # Male Time to   Mortality   (days)   # Females   # Females   Time to Mortality   (days)		# Egg Case											
# Eggs / Time to hatch / # hatched		Time to hatch /						ļ					
Mortality (days) # Females emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Eggs / Time to hatch / # hatched	12614 H												
emerged  Females Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Eggs / Time to hatch / # hatched		Mortality (days)											
Time to Mortality (days)  Cumulative number emerged  # Pairings  # Egg Case  # Eggs / Time to hatch / # hatched													
# Egg / Time to hatch / # hatched		Time to Mortality											
#Egg Case  #Eggs / Time to hatch / # hatched		number											
#Eggs / Time to hatch / # hatched		# Pairings											
Time to hatch / # hatched		# Egg Case											
		Time to hatch /											
Init./Date 11/10 11/11 11/12 11/13 11/14 11/15 11/16 11/17 11/18 11/19 11/20 (1999)			11/10	11/11	11/12	11/13	11/14	11/15	11/16	147	11/18 1m	11/19	17/20

~ .		Date:	17 /21 /	00		
Review:		Date:	141	7 <b>7</b>		
Laborator	v. Ameste	c Biologic	al Science	: South	Burlington	3. Vermont

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99

Sample / Repl.	Response	1 60	1 65	1 2 2								T -=-
Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12614 A	# Males emerged			11								
	Male Time to Mortality (days)			14/24/11/2	}							
	# Females emerged											
	Females Time to Mortality (days)										OL	
	Cumulative number emerged			9							OP_	
	# Pairings										1/30m	
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12614 B	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged	_									OL_	
	Females Time to Mortality (days)										OP	
	Cumulative number emerged										11/30	
	# Pairings								<u> </u>			
	# Egg Case											
	# Eggs / Time to hatch / # hatched				. · · · · · · · · · · · · · · · · · · ·							
12614 C	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged				,						OL	
	Females Time to Mortality (days)										OP	
	Cumulative number emerged										1139m	
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched									-	-	
			1	L		1	1	1	•	1	J	

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: Date: 12/u /99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays32-42

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99 Sample / Repl. <del>23</del> 34 Response <del>28</del> # Males 12614 D emerged Male Time to Mortality (days) # Females emerged Females OV Time to Mortality (days) Cumulative OP number emerged 11/30 # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12614 E emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative 11/30 number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12614 F emerged Male Time to Mortairty (days) # Females OL emerged Females OP Time to Mortality (days) 11/30 number emerged IJM # Pairings # Egg Case # Eggs /

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

11/24

11/25

11/26

11/27

11/28

11/29

1185 Day Correction July30/89 Review: \_\_\_\_\_ Date: \_\_\_\_\_ Z | Z1 | gq Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

11/23

Time to hatch / # hatched

(1999)

Init./Date | 11/21

11/22

12/1

11/30

ject: 99033 M	-C Dead Cr	еек	BII	R: 3629				Tes	t Start:	10/20/9	9	
Sample / Repl.	Response	21	22	23	<del>24</del> <del>35</del>	25 X	<del>-26</del> 37	378	38	29 40	<del>30</del> 41	- <del>31</del>
12614 G	# Males emerged									7.0		
	Male Time to Mortality (days)	1			1							
	# Females emerged				<del> </del>						())	
\\1	Females Time to Mortality (days)										OP	
ilzo grace of milit	Cumulative number emerged	,									TIM	
1/2/10/4 Kay /	# Pairings	11 3000)									11/30	
11120	# Egg Case	3.										
	# Eggs / Time to hatch / # hatched	2,336 ~490mh."	127									
12614 H	# Maies emerged	2-400 Uni							1			
	Male Time to Mortality (days)											
	# Females emerged						<u> </u>				OL	
	Females Time to Mortality (days)							<u></u>			OP	
	Cumulative number emerged										11/30	
	# Pairings	_									TJM	
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1
mergence scor urviving. P = p	ing: Record	any pu	pae wh	ich die (l	D) before	emerg	ence. D	= dead	for flies	which er	nerge bu	it are no
nments:		(1.)	Te.	57.	DUG	Coll	ectiv	20	/-			
<del></del>	<del></del>			<del></del>	<u> </u>		$-\mathcal{O}$	11/3	0/99	<del>-</del>		***
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<del></del>		- <del></del>	<del></del>									

Review: \_\_\_\_\_ Date: (2/21/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12622 A	# Males emerged	·	<del>                                     </del>	ا دا وجدعوم	]					1	1	ŀ
	Male Time to Mortality (days)			1 1.	5d 1/18		Codifer			10,125	ad, vas	54,125
	# Females emerged				1	1, 1.			1			
	Females Time to Mortality (days)				2d.11.5	3511/1/2			50,00	•		
	Cumulative number emerged				~	-4)6	7	2			10	il
	# Pairings				2 622 A	25 36	12B	1/627C	31/6224	3	W/622AE	
	# Egg Case						32A & JG				,	
	# Eggs / Time to hatch / # hatched	<del> </del>					285 28 unhate	necl				
12622 B	# Males emerged		1									
	Male Time to Mortality (days)		5 d 11/16									
	# Females emerged			1		1						1
	Females Time to Mortality (days)			(od,1)8		3017						10/12
	Cumulative number emerged		1	2		3						4
	# Pairings	· · · · · · · · · · · · · · · · · · ·		VH22A	w/621cd	W/622F						W/612A
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12622 C	# Males emerged		l		1							
	Male Time to Mortality (days)	34	7077		60/1/19							
	emerged					1						·
	Females Time to Mortality (days) Cumulative			 		79/1/2/						<u> </u>
	number	1	2	<u></u>	3	4	<b>\</b>	ļ 				
	# Pairings				 	14/3	114		<del> </del>			
	# Egg Case						10 .4					
	# Eggs / Time to hatch / # hatched						is unhated	od				
nergence sco	Init./Date (1999)	11/1/8	13/11	11/12	11/13	11/14	11/15	11/16	1/1/7	11/18	11/19	11/28

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays21-31

Project: 99033 M-C Dead Creek BTR: 3629 Test Start: 10/20/99 Sample / Repl. Response 21 22 23 24 25 26 27 28 29 30 31 # Males 12622 D emerged Male Time to Mortality กไร (days) # Females emerged Females 2000 Time to Mortality (days) number emerged 11/622 11/623 # Pairings # Egg Case NICO mutatchina toped # Eggs / Time to hatch / # hatched # Males 12622 E 1 emerged 4d 1117 Male Time to 30/1/5px Mortality (days) emerged Females Nervalo 20 Time to Mortality (days) Cumulative 2 number emerged Holler 11,252 # Egg Case Bunhatchee # Eggs / Time to hatch / 11/22 # hatched # Males 12622 F ID emerged 611 Male Time to 48 11/20 zd 08/111 Mortality (days) # Females emerged 20,1/20 Females 6 dig Time to Mortality (days) Cumulative 2 number emerged Willera WILZIG W/ 662<u>A</u>3 # Pairings 11/18 Ι EST. # Egg Case 10,00 725 8 unhatelies/100 1/21 Grunhatched 1124 # Eggs / Time to hatch / 67 unharched 4/25

11/10 //// 11/16 11/16 M 11/11 11/17 m Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

11/13

11/12

Date: 12/4/99 Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

# hatched

Init./Date

ctdays21-31

11/20

									,	,		
ample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12622 G	# Males emerged				1			1	1			
	Male Time to	<del> </del>	<del>                                     </del>	<del>                                     </del>	1110			. 14. 4		<del></del>		<del> </del>
	Mortality (days)				50,,/18			10/1/22	400121			<u> </u>
	# Females emerged					1_	11					
	Females Time to Mortality (days)					79"/R	39/18/					
	Cumulative	<del>                                     </del>	<del> </del>	<del>                                     </del>		7	W 4 W				†	<del></del> -
	number emerged	1			1	2	7382A /	5	1 Ce			
	# Pairings					W/622E27 1413	1/22 W/622		W/82368			
		<del> </del>	<del>                                     </del>	<del>                                     </del>	<del>                                     </del>	1	- CW		17/6	>	>10	Lake
	# Egg Case					_ \		اد	(Posa)	>11/kg	390 1	gunhate
	# Eggs / Time to hatch / # hatched							1,508 530000000	1/16 1/16 1/16 1/25 1/25 1/25 1/25 1/25 1/25 1/25 1/25	nhatched	11124- 1125	
2622 H	# Males							1				
2022 11	emerged  Male Time to	<del> </del>			1			34.		<u> </u>		
	Mortality (days)							7d/23	İ	ļ		
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative	1		<del> </del>	†		·	1				
	emerged	ļ	1	<u> </u>								L
	# Pairings											
	# Egg Case											
	# Eggs /	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>		<u> </u>	ļ		<del></del>		
	Time to hatch / # hatched						ĺ	)	}			
	Init./Date	11/10	11/11	11/12	11/13	12/4	11/15	11/16	1447	11/18	11/19	11/20

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ctdays21-31

 oject: 99033 M-C Dead Creek	BTR: 3629	Test Start: 10/20/99
Sject, 33000 in-o bead ofeek	D117. 3023	Test Start. 10/20/35

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Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12622 A	# Males emerged											
	Male Time to	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del>}</del>	<del> </del>	<del> </del>	ļ	<del> </del>
	Mortality	}	1		1	]	}	]	}			1
	(days)		<u> </u>	ļ	<del> </del>	ļ	ļ	ļ	<b></b>	ļ	ļ	<b></b>
	# Females emerged		1			ł	1			}		
	Females		<del> </del>	<del> </del>	<del> </del>	ļ	<b>}</b>	<del> </del>	<del> </del>	ļ	<del> </del>	<b></b>
	Time to Mortality	ĺ	1	1	1	1			]	1	}	}
	(days) Cumulative	<del></del>	<del> </del>	<del> </del>	<del> </del>	ļ	<del> </del>	<del></del>	<del> </del>	<b></b>	ļ	<b>}</b>
	number		}	{	{	}	{	1	İ	1	l	1
	emerged		<del> </del>	ļ	<b>}</b>	ļ	<del> </del>	<b>}</b>	<b> </b>	}	<del> </del>	<b> </b>
	# Pairings			ł			1			}	}	}
	# Egg Case											
	# Eggs /	<del></del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Time to hatch / # hatched			ļ		}		}	}	ĺ	{	{
12622 B	# Males emerged											
	Male Time to		<del> </del>	<del> </del>					ļ	<del> </del>		ļ
	Mortality (days)		•		{		1	}				}
	# Females		<del> </del>		<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	emerged			1	ł		1	ł	1	1	l	Ì
	Females		<del> </del>	<del> </del>	<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Time to Mortality (days)		<u> </u>		}			]	l			}
	Cumulative number						]	1	]		]	
	emerged		<u> </u>		<u> </u>				<u> </u>		<u> </u>	
	# Pairings		1	<u>{</u>				}	}			
	# Egg Case											
	# Eggs /		t		<b> </b>	<del></del>	<del>                                     </del>		<b>†</b>	<del> </del>	<del> </del>	<del> </del>
	Time to hatch / # hatched			}		}		}		}	}	1
12622 C	# Males		1	<b></b>			7	}				<del> </del>
12022 0	emerged		}	}	}	}	1	1	1	1		1
:	Male Time to Mortality								1			}
:	(days)		ļ		ļ	ļ	<del> </del>	ļ	}		ļ	ļ
,	# Females emerged		{	{				1				}
	Females		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	Time to Mortality (days)			{		}						}
	Cumulative		<del>                                     </del>	<del>                                     </del>	<del> </del>	<del> </del>	1	1	<del>                                     </del>	1	1	<del> </del>
	number emerged		<u> </u>	1	<u></u>	1	<u> </u>			<u> </u>		
	# Pairings											
	# Egg Case	<del></del>										
	# Eggs /		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>	<del> </del>
	Time to hatch / # hatched			<u> </u>								
	Init./Date (1999)	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

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ctdays32-42

Project: 99033 M-C Dead Creek	BTR: 3629	Test Start: 10/20/99
	· <del></del>	· · · · · · · · · · · · · · · · · · ·

Sample / Repl.	Response	21	22	23 34	-24	25	- <del>26</del> 37	<del>-27</del> -	<del>28</del> 35	29	30	31	
12622 D	# Males emerged												
	Male Time to	ļ	ļ	<del> </del>	<u> </u>	<u> </u>						<del> </del>	
	Mortality				ĺ	1				Ì	1		
	(days) # Females	<del>                                     </del>	<del> </del>	<del> </del>		<del></del>				<del> </del>		<del> </del>	
	emerged					İ		1					
	Females Time to Mortality (days)								<del></del>				
	Cumulative number emerged												
	# Pairings												
	# Egg Case												
	# Eggs / Time to hatch / # hatched												;
12622 E	# Males emerged									<del></del> -			
	Male Time to Mortality (days)												
	# Females emerged												
	Females							<del></del>					
	Time to Mortality (days)				1	30,1/28		1			1		ŀ
.1,9	Cumulative												
· ~ (1)	number emerged			<u> </u>						<u> </u>		<u> </u>	`
karion	# Pairings				}	10/10326							
	# Egg Case	9											
	# Eggs /	810	<b></b>	<del> </del> -		<del>                                     </del>		<del> </del>		<del> </del>	<del> </del>		ŀ
	Time to hatch / # hatched	11/23 unh		ľ	}			{			1		
12622 F	# Males	810 0138 unh 11/27 26 unha	tend										
12022 1	emerged	11)2		1			-		L			ļ <u>-</u>	
	Male Time to Mortality (days)			40									
	# Females emerged		i										ŀ
	Females Time to Mortality (days)												
	Cumulative number		· <u>·</u>	9									
	# Pairings			<del>                                     </del>		<del>                                     </del>					<del> </del>	<del> </del>	
	# Egg Case												
	# Eggs / Time to hatch /			-							-		
	# hatched	1415	4.455	4455	4415	1115-	44100	1 4 4 15 5	1117	11:00	144/00	140/4	l
_	Init./Date (1999)	11/21	11/22	17/23	11/24	11/25 m	11/26	11/27	11/28 TM	11/29	11/30	12/1	

mple / Pop!	Pagazzas	T 64	1	<del></del>	<del></del>		I	T ==				<del></del>
mple / Repl.	Response	21	22	23	24 35	25	26-	27	28	29 70	- <del>30</del> 41	31
2622 G	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
2622 H	# Maies emerged											
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged		}	ļ	<u> </u>			<u> </u>			ļ	
	# Pairings				ļ							
	# Egg Case								ļ			
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1
	ring: Record	d any pi	upae wh	ich die (	D) before	e emerg	ence. D	= dead	for flies	which er	nerge bi	it are n
ving. P = p ents:	шра											
	<u> </u>	-57	Dag	7 6	OFFR	Nu	<u> </u>		11/30	192		
					<del></del>							
									<del></del>	<del></del>		

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ctdays32-42

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
10000	# Males		' '	10		ļ. <u></u>		ļ		ļ · · ·		
12622 A	emerged											
	Male Time to Mortality	OL										
	(davs) # Females		<del> </del>		-		<del> </del>	-				<b></b>
	emerged Females	OP		ļ	ļ	ļ <u>.</u> .	ļ.—-	ļ				ļ
	Time to Mortality (days)	,										İ
	Cumulative number											
	emerged				-	<del></del>		<del>                                     </del>	ļ	<del> </del>		
	# Pairings			<u> </u>	ļ	<u> </u>	<del> </del>	ļ		ļ <u>.</u>		
	# Egg Case											
	# Engs /					<del> </del>	<del> </del>		ļ			
· · · · · · · · · · · · · · · · · · ·	Time to hatch / # hatched				ļ		ļ	ļ	ļ			
12622 B	# Males emerged											}
	Male Time to Mortality	$\Delta 1$										
	# Females	10		<u> </u>		<del> </del>			<u> </u>			
	emerged Females	OP	<u> </u>	<u> </u>	ļ	<u> </u>	<u> </u>	ļ	ļ			<u> </u>
	Time to Mortality (days)											
	Cumulative number											
	emerged # Painings				<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>
			<del> </del> -		<del> </del>		<del>                                     </del>	<del>                                     </del>		<del> </del>		<del> </del>
	# Egg Case											Ì
	# Eggs /			<del> </del>	<del>-</del>							-
	Time to hatch / # hatched			ļ	-	ļ	ļ					
12622 C	# Males emerged					İ						-
	Male Time to Mortality	$\bigcap$										
	(days) # Females emerged						<del> </del>			<del> </del>	<b></b>	<del> </del>
	Females	06			<del> </del>	ļ	<del> </del> -				ļ	ļ <u> </u>
	Time to Mortality (days)											
	Cumulative number											
	emerged # Pairings				<del>                                     </del>		-		-	<del>                                     </del>		<del> </del>
					-	-	-	-	-	<del> </del>		ļ
	# Egg Case											
	# Eggs / Time to hatch /			<del>                                     </del>	<del>                                     </del>	<del> </del>	<del>                                     </del>			†	<del> </del>	<del> </del>
	# hatched	40/0	10/0	140/1	4015	140/0	10.77	140'0	40.0	10/10	14044	140/46
	Init./Date (1999)	12/2	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11	12/12

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surviving. P = pupa

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
40000 0	# Males		+	-	ļ	<del> </del>	-		<u> </u>	-		<u> </u>
12622 G	emerged											
	Male Time to Mortality	M										
	(dars) # Females emerbed		7		<del> </del>		1	<del> </del>	<del> </del>		<u> </u>	<del> </del>
	Females	HY	<del> </del>	<del></del>	<del>-</del>		<u> </u>	ļ	<u> </u>		ļ	<u> </u>
	Time to Mortality (days)									1		
	Cumulative number											
	emerped	<del> </del>	<del> </del>	+	<u> </u>	<del> </del>	<del></del>					<del> </del>
	# Pairings											
	# Egg Case											
	# Eggs /	ļ										ļ
	Time to hatch / # hatched											
12622 H	# Males emerged		<del>                                     </del>		1	1		<del></del>				
	Male Time to		<del> </del>	+	+	+	<del> </del>		<del></del>	<del> </del>		<del> </del>
	Mortality (days)	01_										
	# Females emerged	5D										
	Females Time to Mortality		<del>                                     </del>						<del>  -</del>			<del>                                     </del>
	(days) Cumulative		<del> </del>		<del> </del>			<u> </u>	<del> </del>		<del> </del>	<del> </del>
	numbe emerge											
	# Pairings											
	# Egg Case		<del> </del>	+	<del> </del>	+		<del> </del>	<del> </del>	1		<del> </del>
	# Egg Case											
	# Eggs / Time to hatch / # hatched		<u> </u>			1					ļ	T
		13/3	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11	12/12
<del></del>	Init./Date							112/0	12/3	112/10	114/11	

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ctdays43-53

# Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ate: /0//6	No. of Egg Cas	ies 781a		
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use	
10/16	0	19.2°C	V			
10/17	1	19,30				
10/18	2	22.6		Franker HAP		
10/19	3				(	ri chonic
10/20	4	16.7	/		10/20 C.	t-chronic
	5					

SOURCE: Aquerec Culpures

- - - 4 - - 1

# Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ate: 10/15	No. of Egg Cas	ses 7	· · · · · · · · · · · · · · · · · · ·	
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use	
10/15/99	0	119.00C	V	7 cases		
10/16	1	6	V			
16/17	2	20,3	15 JG			
10/18	3	22.5		ryg (ses -) con	la.	
10/19	4				Chonz	T. 10/19
10/20	5				Chronic	C.T. 10/19 START C.T. 10/20 START
						START

Source: Aquarec cultures

# Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ate: 10/2/627	No. of Egg Cas	es 4	· · · · · · · · · · · · · · · · · · ·	
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use	
10/27	0					
10/28	1					
10/29	2	23.5				
10/30	3	23.2	V	HATCHING	AUX MAL	E AV FRS
	4					
	5					
Source of	egg cases:	Aguerec .	rulines			]

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

	ī	=	123.67.00	1	T.	<u> </u>	1/10	1	1	<del>                                     </del>	73.	T .	T .	Γ	70	Đ .		10/30 Dey 10			- SSE -
66/0		10	12 18/3 18/3		1-	×	18 18 18	1	]	×	1,00 1,00 1,00 1,00 1,00 1,00 1,00 1,00	9		×	77 8,5 8/6		1	×	<b>%</b>		Collect ammonia alkalinity and hardness samples on Days 0 14 20 40 and of fast
10/20/99		6	18.	7.(0	10	×	33.5	4	5.7	×	22.2	7.6	4.9	×	3	4.6	53	×	<b>S</b> S		0
Test Start		∞	23.42.8 323.			×	0.6%			×				×				×	19//ZB	,dn	7 00 7
35629 Te		7	12 2 12 18 19 19 19 19 19 19 19 19 19 19 19 19 19	7.5	رم م	330	23.5	4.4	N %	340		46	4.8	330		7.6	S S	365	18/87	esting gro	00000
BTR: 3	lysis	9	32.7			×	23.4 4.54 4.54			×				×				×	19/26	ly for this t	, adjument
	Day of Analysis	5	18.18 8.18 12.	54	5.7	×	05%	7.7	0.0	×		4.4	کہ ان	×		7.6	5.0	×	19/25	e destarra	hardage
٧	Day	4	6 /2 10	<u> </u>	1	×		(	(	×		(		×		1	\	×	1922	d within th	Linit.
Dead Creek		3	Sall in			×				×				×				×	1983 1983	aker place	1000
99033 Dea		2	12219	<b>1</b>	4	×	71.8	ዯ	4	×		A	1	×		4	个	×	19/2R	fative bea	مسوموالو
Project: 99		1		7.5-	-8-9	×		-8·E	7.0-	×		-8t	- F	×		78-	4	×	1527 1527	02	
Proj		0	23.3	7.6	5.8	None	560	2.8	6. (	370/5	23.6	19	(.2	31/1/5	23.5	El	5.7	MA	10/20	rement of,	
Project: Menzie-Cura & Associates		Parameter	T (°C)	Hd	DO (mg/L)	Conductivity	7 (0°) T	Hd	DO (mg/L)	Conductivity	T (°C)	Н	DO (mg/L)	Conductivity	T (°C)	Hd	DO (mg/L)	Conductivity	Init./Date (1999):	Comments: Measured temperature is a measurement of A epresentative beaker placed within the tast array for this testing groun	
Project: Menzie-(		Sample	12611				12612	4.044	1.17		12613				12614			<del> </del>		Comments: Measured	

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Dry 9 - Ser up Aux Mela Bezuers

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dead Creek	ad Cree	¥		BTR: 3	5629 Te	st Start	35629 Test Start 10/20/99	66
						Day	Day of Analysis	ysis				
Sample	Parameter	0	-	2	3	4	2	9	7	8	6	9
12622	T (°C)	hão									3 4 5 C	80.00
	Hd	7.0	73-	4	}	)	76		0.4.		7.6	1
	DO (mg/L)	138	6.9	个			6.1		0.0		5.5	}
	Conductivity	1/43	×	×	×	×	×	×	355	×	×	×
	T (°C)"											
	Hd											
	DO (mg/L)						\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \					
	Conductivity		×	×	×	× \	X	×		×	×	×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity		×	×	×	×	×	×		×	×	×
	T (°C)											
	Hd											
	DØ (mg/L)											
	Conductivity		×	×	×	×	×	×		×	×	×
	Init./Date (1999):	10/20	10/21	1977	19/23	19/23	19/25	1978°	19927	1998	1963	<u>2</u>
Comments: Measured	Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group	rement of	a represe	Hative bea	sker place	d within th	e set arra	y for this t	ésting gro	H.		
Ha bas O Company	Manage O O and all 3 times weekly conductivity once weekly. Collect ammonia alkalinity and hardness samples on Days 0.14.20.40 and of test	vity once	weekly C	ollect amn	syle einor	alinity and	hardness	samples	on Days 0	14 20 4	O and and	of tact

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Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-C	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dea	Dead Creek			BTR: 39	3529 Tes	Test Start	10/20/99	6
						Day	Day of Analysis	ysis (				
Sample	Parameter	11	12	13	14	15	16	11	18	19	20	21
12611	T (°C)	35,560	1:00	22.625	12.8 13.55	22/2	2018	25.CB 25.CF 25.CF	6. ct. /	13/2	22.52	8. 6. 8. 6.
	Hd	>	19/2		9.4		N.			4	75	4.5
	DO (mg/L)		88		5		3			6.5	4.6	200
	Conductivity	× no	×	×	360/	×	×	×	×	×	360	×
12612				25.68 25.69					22.58 25.66 7.7.7.		4 CE	
	Н		35		46		7.6			44	7.4	76
	DO (mg/L)		63		5,2	و	45		`	100 N	-   S	4.5
	Conductivity	×	×	×	350/	×	×	×	×	×	380	×
12613	T (°C)											
	Hd		7.8		4.8		11			4.4	78	76
	DO (mg/L)		90		83	3	4			6,0	5.7	44
	Conductivity	×	×	×	330	×	×	×	×	×	8/	×
12614	T (°C)											
	Hd		7.6		44		7.6			1, 1,	76	76
	DO (mg/L)		6,5		79		tig			6,3	5.2	N. P.
	Conductivity	×	×	×	360/	×	Xm 7	×	×	×	380	×
	Init./Date (1999):	42	138	11/6	11/3	11/4	11/5	386	11Ph	11/8	1 <del>1</del> 18	01/4
Comments: Measured	Comments: Measured temperature is a measur	rement of	a represer	ntallive bea	rement of a representative beaker placed within the test array for this testing group	1 within th	e test arra	y for this to	esting gro	ġ		

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

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Project: Menzie-	Project: Menzie-Cura & Associates	Proj	Project: 99	99033 De	Dead Creek	J		BTR: 3	3529 Tes	Test Start	10/20/99	6
						Day	Day of Analysis	1	6			
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	21
12622	T (°C)											
	Hď		7,8		tt		7.5				4	な、け
	DO (mg/L)		6,6		\ \ \ \		5.3				8	N. 9.
	Conductivity	×	×	×	25	×	×	×	×	×	380	×
	T (°C)				,							
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×		×	×	×	×	×		×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×		×	×	×	×	×		×
	(°C)								ļ		<u> </u>	
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×		×	×	×	×	×		×
	Init./Date (1999):	# P P P P P P P P P P P P P P P P P P P	部	13//2v	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	11/4 CJ	11/5	11/6	<b>XX</b>	11/8	14.89 87.41	光。
Comments: Measured	Comments. Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.	rement of	a represer	ntative be	aker place	d within th	e test arra	y for this	testing gro	ďĎ.		

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Date: 12/21/99

Review: Date: 12/11/FP clenvchr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Manage (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-Cura & Associates	Sura & Associates	Pro	Project: 99	033 Dea	99033 Dead Creek	٧.		BTR: 36	3629 Test Start	1 1	10/20/99	
						Day	Day of Analysis	ysis				
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	32
12611	T (°C)	23.5x	15/18/	200	25.00	13.66	92.79	1200	2/2	22/201	25.66	12.56 12.66 12.66
	Hd		43	90		ナイ		18 Li		7,4		
	DO (mg/L)		59			5,2		5,0		2,		
	Conductivity	×	×	×	×	×	×	133	×	×	×	×
12612	T (°C)											
	Hd		75			45		Ht		9 1		
	DO (mg/L)		6.3			5,3		5.0		2/5		
	Conductivity	×	×	×	×	×	×	360	×	×	×	×
12613	T (°C)											
	Hd		7.6			75		75		2.6		
	DO (mg/L)		9			5,3		5.1		5.50		
	Conductivity	×	×	×	×	X	×	360	×	×	×	×
12614	T (°C)											
	Hd		14			7,6		4,6		p/L		
	DO (mg/L)		6.3			0'0		2,8		(',')		
	Conductivity	×	×	×	×	X	×	359	×	×	×	×
	Init./Date (1999):	14/1/21	翻	न्निति	13/14	南阳	11/16	部	11/18	31/13	14/28-1	11/PM
		o tromb	) controcon	atative be	ative beater placed within the feet array for this test	d within th	o toct prin	v for this t	S. O. O. O. O.			-

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly. Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

ctenvchr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont Date: 12/21/49

Review:

000107

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dea	Dead Creek	×		BTR: 36	3629 Test Start	t Start	10/20/99	6
						Day	Day of Analysis	lysis				
Sample	Parameter	22	23	24	25	26	27	28	29	30	31	32
12622	T (°C)											
	Hd		70			7,6		45		<i>p</i> <sup>2</sup>		
	DO (mg/L)		1-			0,4				$-\frac{7}{\alpha^2}$		
	Conductivity	×	×	×	×	×	×	350	×	)×	×	×
	(°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×	×	×	×		×	×	×	×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×	×	×	×		×	×	×	×
	(°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×	×	×	×		×	×	×	×
	Init./Date (1999):	13/1/	388	17/3	13/64	22/25	11(16)	-21/16 1/17-	41/18	8/17	11/20	13/21
Comments: Measurer	Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.	ement of	a represe	ntative bea	aker place	d within th	e test arra	v for this t	esting aro	g		

Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly. Date: 12/21/99

000138

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

12611   T (°C)   22	Project: Menzie-	Project: Menzie-Cura & Associates	Pro	Project: 990	99033 Dea	Dead Creek	پ		BTR: 3(	3629 Tes	Test Start	10/20/99	
							Day	of Anal	ysis				
	Sample	Parameter	33	34	35	36	37	38	39	40	41	42	43
	12611		75.68		Z :	4.6	5	14,000	<b>\</b> .9	5. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.	25.23.3	32.66	2. C. C. C. C. C. C. C. C. C. C. C. C. C.
		Hd	55		9/		53	0		4.5		74	Š
		DO (mg/L)	5,3		0		pig			4.9		3.4	
		Conductivity	×	×	N. C.	×	×	×	×	×	×	330	×
	12612	T (°C)									1	1	1
1   1   1   1   1   1   1   1   1   1		Hď	46		7.6		2,0			7.5	1	1	\
		DO (mg/L)	5,8		9		7.0			1	\	1	1
		Conductivity	×	×	\$2.5 \$2.5 \$2.5	×	×	×	<b>&gt;</b> <	338/	×	1	×
	12613	(၁c) T									1	(	1
		Hd	7.(		7		7.			7.5	1	{	(
		DO (mg/L)	5.9		9		ر- ر-			1, 3	l	(	1
		Conductivity	×	×	355	×	×	×	×	×98/	×	1	×
	12614	T (°C)										)	
ا القاا		Hd	7,6		41		7,5			4.7	2,6		
ا امّا ا		DO (mg/L)	5,0		12		0,9			7,0	ري ج		(
القاا		Conductivity	×	×	360	×	×	×	×	}	320%		×
ו ומ		Init./Date (1999):	1/82	11/23	11124	11/1/75	11/26	198	11/28	11/88	11/30	12/1	1248
- I	Comments: Measured	l temperature is a measu	rement of	l ŭ	ntative bea	ıker place	d within th	e test arra	y for this t	esting gro	dn.		
	Measure D.O. and pH	3 times weekly, conducti	vity once	1	ollect amn	nonia, alk	alinity, and	hardness	samples	on Days u	), 14, 20, tr	len weeki	_

Review:
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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

1

Project: Menzie-	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dead Creek	ad Creel	¥		BTR: 3	3629 Test Start 10/20/99	t Start	10/20/9	
						Day	Day of Analysis	ysis				
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	43
12622	T (°C)											
	Hd	tt		1		7,7			4.6		45	4,4
	DO (mg/L)	Gist.		(0)		(.5			6,9		53	かり
	Conductivity	×	×	1420	X	×	×	×	×	×	350	×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
	Init./Date (1999):	11/22	11/23	11/241	11/25	11/26	11/27	11/28	11/29	11/39	12/1 17/1	17% is
Comments: Measured	Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.	rement of		intative bea	aker place	d within th	e test arra	y for this	esting gro	dn.		
Measure D.O. and pH	Measure D.O. and pH 3 times weekly, conductivity once weekly.	vity once v		Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly	nonia, alk	alinity, and	i hardnes	samples	on Days C	, 14, 20, t	hen weekl	

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Audge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-(	Project: Menzie-Cura & Associates	Project:		99033 De	Dead Creek	\ \ \		BTR: 3	3629 Tes	Test Start	10/20/99	
						Day	Day of Analysis	ysis			-	
Sample	Parameter	44	45	46	47	48	49	20	51	52	53	54
12611	T (°C)	(C. C. C.)	13.99	33.55	13.5							
	Hd	4.4		4.3	7-3							
	DO (mg/L)	4.7		24	3.0							
	Conductivity AtH/Pmon	×	×	340	333×	×	×	×	×	×		×
12612	T (°C)											
	Hd											
	DO (mg/L)								j			
	Conductivity	×	×		×	×	×	×	×	×		×
12613	T (°C)											
	Hď					!	i .	,				
	DO (mg/L)									,		
	Conductivity	×	×		×	×	×	×	×	×		×
12614	(C) 1	: : : : : : : : : : : : : : : : : : : :										
	На											
	DO (mg/L)								į	i i	,	
	Conductivity	×	×		×	×	×	×	×	×		×
	Init./Date (1999):	12/3	12/2	13/6	12/gm	12/7	12/8	12/9	12/10	12/11	12/12	12/13
Commont: Marriand formarative is a mose			ronroco	ptative be	yorla John	4 within th	ement of a representative heaker placed within the test array for this testing group	v for this	peting aro	9		

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness at end of test for any samples ending. Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group.

Review: Date: 1 L/U /97 ctenychr.doc Capacier Biological Sciences, South Burlington, Vermont

# Midge (Chironomus tentans) Chronic Toxicity Test Day 20 Survival and Dry Weight Data

Client: Menzie-Cura & Assoc.	Project: 99033 Dead Creek	BTR: 3641
	Test Start: October 21, 1999	Day 20: November 10, 1999
		Ashad

				Test Start:	Octobe	r 21, 1999	Day	20: Nove	mber 10,	1999
Sample	Repl.	Initial # Larvae	# Alive	11/8/99 Init.	Larvae preserve d? Y/N	Crucible #	# Weighed	Ashed Pan Wt.	Ashed Pan Wt. + Larval Dry Wt.	Ashed Pan and Ashed Larval Wt.
12665	1	12	OPILOE	TM	Y	10	}{	2.320195	2,346,80	2,326.7
	J	12	OPALIE		Y	11	7	2,383,33	2,290.05	2, 282.8
	K	12	IP 8L DE	1m	Y	12	8	2389.34	2,420,25	2,395.18
	L	12	IPIL 8E	TM	Υ	13		2,484.60	e 2,483,41	2,484,70
			,						36	
12668	1	12	3P3L1E	TM	Y	14	3	2,263.71	2 271.\$3	= 2,263.7
	J	12	6P4L OE		Y	15	1	2,385,22	-3,398.1	<del>-</del> 2,386,
	K	12	31810E		Y	16	8	2.426.14	2,448,75	2,430,3
	L	12	a Paloe	TM	Υ	17	<u></u>	2444.70	3,453,15	2,445.07
								·		
<del> </del>	1	12			Y	]				
:	j	12			<u>·</u> Y					
	K	12			Y					
		12			Y					
			<u></u>	L	· · · · · · · · · · · · · · · · · · ·	اــــــــــــــــــــــــــــــــــــ	L	<u> </u>	<u> </u>	L
		12			Υ					
	J	12			Υ					
į	K	12			Υ					
į	L	12			Υ				1	

	J	12	Y	<u> </u>	
	K	12	Y	1	
	L	12	Y		
				 <del></del>	······································
		12	Y		
	J	12 12	Y		
···	J K	12	Y		

Date / Time / Init. Larvae in oven: 11/26/	99 16.45	Date / Time / Init. L	arvae	out of oven: 11/27	15:00 JG
Date / Time / Init. Larvae in furnace: 1		Date / Time / Ini	t. Larv	ae out of furnace:	
Balance QC: Initial (20 mg = २००० न	) Final (	20 mg = 700.06	) B	alance Asset #:	
Date/time In (1/26, u5 Temp(°C) \$6	Init.コG	Date/time outit	27	Temp(°C) Fo	Init. JG
1 (6.					

Comments: P = pupa, L = larva, E = fly previously emerged (larval casing left behind on water surface).

Date: 12/22/99 Reviewer:

ctday20doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Project: 99033 M-C Dead Creek BTR: 3641 Test Start: 10/21/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12665 A	# Males emerged											
	Male Time to			1			<del> </del>					<del>                                     </del>
	Mortality (days)				<u> </u>							
	# Females emerged						İ					
	Females Time to Mortality (days)											
	Cumulative				T		1				1	
	number emerged		<del></del>		<del> </del>	ļ	1		ļ	ļ	<u> </u>	ļ
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											<del> </del>
12665 B	# Males emerged											
	Male Time to Mortality				<u> </u>							
	(days) # Females	<u> </u>	<del> </del>		<del> </del>	ļ	<u> </u>	<u> </u>	<u> </u>			<del> </del>
	emerged										}	
	Females Time to Mortality									_		
	(days) Cumulative	-	-	-	<del> </del>	-		<del> </del>	1	<del>                                     </del>	<del> </del>	<del> </del>
	number emerged											
	∓ Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12665 C	# Males											
.2000	emerged				<u> </u>						ļ <u>.</u>	<del> </del>
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)						<del> </del>			-		
	Cumulative	<del></del>	<del> </del>	<del> </del>	<del> </del> -	<del>                                     </del>		<del> </del>	<u> </u>	<del> </del>	<del>                                     </del>	
	ewerbeg unwper				<u> </u>	ļ	ļ		<u> </u>			<u> </u>
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20	11/2

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/2L/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Egg (26e incuberion Temp 24°C 11/24/99 ctdays21-31

BTR: 3641 Project: 99033 M-C Dead Creek Test Start: 10/21/99 Sample / Repl. Response 21 22 23 24 25 26 27 28 29 30 31 # Males 12665 D emerged Male Time to (0)/1/d Mortality (days) # Females emerged Females pd illit 5d 341130 Time to Mortality (days) Cumulative 5 number emerged WIGGSFOR # Pairings \c # Egg Case 5 what give of # Eggs / 1,670 Time to hatch / 2 junhatohed 11/22 # hatched # Males 12665 E emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12665 F bezd emerged 8011/23 (00/10 Male Time to 60,119 Mortality (days) emerged Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched 11/11 Init./Date 11/12 11/18 11/12 11/21 (1999)Emergence scoring: Record any pupae which die (D) before emergende. D dead for flies which emerge but are not

surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/22/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays21-31

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12665 G	# Males emerged						-					
	Male Time to Mortality (days)											
	# Females emerged											
	Females Time to Mortality (days)											
	Cumulative number emerged	ļ				<u> </u>						
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched					<del>                                     </del>						
12665 H	# Maies emerged											
*)	Male Time to Mortality (days)											
	# Females emerged											
ļ	Females Time to Mortality (days)											
	Cumulative number emerged	1*										
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	1711	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20	11/21
mergence scor	ing: Record		pae wh	ich die (	D) before	e emerg	ence. D	= dead	for flies	which e	merge b	ut are i
urviving. P = punments:	ира						<del></del>	<del></del>		<del></del>	<del></del>	
	emergent	case	found	in so	mpie	12665	i H					
	priorato	Insta	lling e	<u>emerg</u>	ent tro	$i\rho s$	11/10/9	79 Jm	<del></del>			
								<del></del>	<del></del>			
											<del></del>	

Review: Date: 12/22/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays21-31

Project: 99033 M-C Dead Creek BTR: 3641 Test Start: 10/21/99

Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12665 A	# Males emerged											
	Male Time to			<del>                                     </del>	1	j			1.		<del>                                     </del>	<del>                                     </del>
	Mortality (days)								,			
	# Females		1	T		†···			<del> </del>			1
	emerged			ļ	ļ							
	Females Time to Mortality (days)										ļ 	
	Cumulative number			1					]	}	!	
	emerged		ļ	ļ	ļ			ļ				ļ
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch /			<del> </del>				<del>                                     </del>				
	# hatched		<del></del>	<del> </del>	<del> </del>		<del> </del>	<del> </del>	<del> </del>			<del> </del> -
12665 B	# Males emerged									}		
	Male Time to		<del> </del>	h	<del> </del>			<del> </del>	<del> </del>			<del> </del> -
	Mortality							1			Ì	1
	(days) # Females		<del> </del>	<del> </del> -	<del> </del>	<del> </del> -	<del> </del>	<del> </del> -	<del> </del>	<del> </del>	<del> </del>	<del> </del>
	emerged					!						
	Females		1						<u> </u>			<del></del>
	Time to Mortality (days)											
	Cumulative number							}				
	emerged				<u> </u>							
	# Pairings											
	# Egg Case											
	# Eggs /	<del></del>	<del> </del>	<del> </del>	<del> </del>		<del> </del>	<del> </del>	<del> </del>	<del> </del>		
	Time to hatch / # hatched		1					}				-
40005.0	# Males		<del></del>	<del> </del>	<del>                                     </del>		<del> </del>					
12665 C	emerged			1	1					ļ	ļ	
	Male Time to			<u> </u>	<del> </del>			<del> </del>	- A		<del> </del>	<del>                                     </del>
	Mortality (days)		1	{	<b>[</b>		İ	Ι.	012	$\mathcal{U}$	1	
	# Females emerged								00)	M		
			<u> </u>	<u> </u>	ļ	ļ	<del></del>	ļ	1010	جميا	ļ	
	Females Time to Mortality (days)					1			Im 39			
	Cumulative			<del></del>								1
	number emerged										1	
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch /			<del>                                     </del>	-	-						
	# hatched		1	ļ.,	<u> </u>	ļ <u>.</u>	ļ	<del> </del>	<u> </u>	<del> </del>	-	<del> </del>
	Init./Date	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1	12/2
	(1999)		1	<u> </u>	1	}	1	J	1	1	J	1

	Time to hatch / # hatched				1				(			
	Init./Date (1999)	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1	12/2
Emergence sco surviving. P = 1				ich die (	D) before	e emerg		D Wro	te in	with	9	
Review:	Date: 12 Biological Sc			ington, V	ermont			`	Samp i	e # \	) 29	ctdays32-42

Jm 11/29 0001110

Midge (Chironomus tentans) Chronic Toxicity Test Biological Monitoring Project: 99033 M-C Dead Creek BTR: 3641 Test Start: 10/19/99 Sample / Repi. Response -23 25 761 # Males 12665 D emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12665 E emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12665 F emerged Male Time to i dead Mortality emerging (days) # Females emerged Females SUL 50,799 Time to Mortality unknown (days) Cumulative 5 emerged # Pairings 10 # Egg Case 404 24 unn 13/2 # Eggs / Time to hatch / 8 unh. 12/3 # hatched 11/24 11/27 Init./Date 11/22 11/23 11/25 11/26 11/28 11/29 11/30 12/1 12/2 (1999)

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa Test Der Correction -11/20/99 Review: \_\_\_\_\_ Date: 12/22/94
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont ctdays32-42

CC(14:

	Response	21	-22	23	24	25	26	27	28	29	39/	31
		232	22	34	24 35	25	26	27/8	28	320	TH.	3/2
12665 G	# Males emerged		{		{							
	Male Time to Mortality			1	1							
1	(days)	<u> </u>		<u> </u>	<del> </del>		<u> </u>	ļ		<u> </u>		
	# Females emerged	}		j						}	ļ	
	Females Time to Mortality (days)											
	Cumulative number				}							
-	emerged	<del> </del>	+	<del> </del>	<del> </del>	<del> </del>	! 	<del> </del>		<del> </del>		
	# Pairings		ļ	ļ	ļ	ļ		ļ				
	# Egg Case											
}	# Eggs /		<del> </del>	<del> </del>	<del> </del>	<del> </del>				<del> </del>	<del> </del>	
1	Time to hatch / # hatched	i			1	1	ĺ			1	1	
12665 H	# Males emerged											
-	Male Time to		<del> </del>	<del> </del>	<del> </del>	<del> </del>	<del> </del>			<del> </del>		
	Mortality (days)	1		ļ			}			<b>[</b>		ļ
	# Females emerged											
-  -	Females ime to Mortality ( (days)		<del> </del>									
<del>[-</del>	Cumulative		+	<del> </del>	<del> </del>	<del></del>	<del> </del>	<del> </del>	<b></b> -	<del> </del>	<del> </del>	<del> </del>
	number emerged			<u> </u>		ļ				ļ		
	#Pairings	†			!							
	# Egg Case											
	# Eggs / Time to hatch /		<del> </del>									
	# hatched Init./Date	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1	12/2
	(1999)									]		I

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ctdays32-42

BTR: 3641 Test Start: 10/21/99 Project: 99033 M-C Dead Creek Sample / Repl. Response 43 44 45 46 47 48 49 50 51 52 53 # Males 12665 A emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12665 B emerged Maie Time to Mortality # Females emerged Females Time to Mortality (days) Cumulative number emerged # Pairings # Egg Case # Eggs / Time to hatch / # hatched # Males 12665 C emerged Male Time to Mortality (days) # Females emerged Females Time to Mortality (gays) Cumulative number emergeo # Pairings # Egg Case # Eggs / Time to hatch / 13/4 Init./Date 12/3 12/5 12/6 12/7 12/8 12/9 12/10 12/11 12/12 12/13 (1999)

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

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ctdays43-53

Project: 99033 M-C Dead Creek BTR: 3641 Test Start: 10/21/99

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
12665 D	# Males emerged			1								
	Male Time to Mortality (days)		DL									
	# Females emerged		OP									
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12665 E	# Males emerged											
	Male Time to Mortality (days)		QL									
	# Females emerged		OP									
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case										<u>}</u>	
	#Eggs / Time to hatch / # hatched											
12665 F	# Males emerged											
	Male Time to Mortality (days)		OL									
	# Females emerged Females		90	L	ļ	ļ	<u> </u>	<u> </u>		<u> </u>		
	Time to Mortality (days)  Cumulative				ļ	ļ	ļ	ļ				
	number emerged	·					ļ	-		<u> </u>	<u> </u>	
	# Pairings					ļ	<b></b>	ļ	ļ	<u> </u>	<u> </u>	
	# Egg Case											{
	# Eggs / Time to hatch / # hatched						1			<del> </del>	<del> </del>	<b> </b>
	Init./Date (1999)	12/3	12/43	12/5	12/6	12/7	12/8	12/9	12/10	12/11	12/12	12/13

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

Review: \_\_\_\_\_ Date: 12/22/97
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ctdays43-53

Sample / Repl.	Response	43	44	45	46	47	48	49	50	51	52	53
				10						ļ ·		
12665 G	# Males emerged						-					
	Male Time to Mortality		OL									
	(days) # Females		100	<del>                                     </del>				+	<del> </del> -	<del> </del> -	<del> </del>	<del> </del>
	emerged		OP									
	Females Time to Mortality (days)											
	Cumulative number emerged											
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched						<del>-  </del>	1				
12665 H	# Males emerged											
	Male Time to Mortality (days)		$\bigcirc$									
	# Females emerged		100									
	Females Time to Mortality (days)											
	Cumulative number											
	emerged	L					1	l	1	<b>}</b> .		
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched							-	<del> </del> -	<del> </del>	<del> </del>	
<u> </u>	Init./Date	12/3	12/4	12/5	12/6	12/7	12/8	12/9	12/10	12/11	12/12	12/1
mergence sco urviving. P = p nments:	(1999) ring: Recor- upa	d any p	upae wh	ich die	(D) before	re emerç	gence. [	) = dead	I for flies	which e	merge b	ut are
		<del></del>										
		_										

Review: \_\_\_\_\_ Date: 12/22/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31	
12668 A	# Males emerged	ı		•				-					1
	Male Time to Mortality (days)	69/12				40,110							]
	# Females emerged			1		11	1	1		1.			
	Females Time to Mortality (days)			ad."16		STATE	11/20	Hotokid		69,1/25			
	Cumulative number emerged	1		2		25	6	7		8			
	# Pairings			W/668D		7/658F	WCESA JES	31/4	D.	W/668412	J . J		]
	# Egg Case				100 mg		10 6			اد	1013	1200 m	
	# Eggs / Time to hatch / # hatched				070 hatel		1,278	2		432 14 What.	1175 cles 142	2100	1
12668 B	# Males emerged	· · · · · · · · · · · · · · · · · · ·					ì			10 2012		11	1
	Male Time to Mortality (days)						4d 11/20				-	Mad.	
	# Females emerged								1	1 [		Tille	
	Females Time to Mortality (days)							29/1/2	5d 1/13	40 40			
	Cumulative number emerged							2	2/ Holio?	5		7	
	# Pairings							wice 4G	<i>जी प्रकृति</i>	663 LLSF		11/18 25 4	1
	# Egg Case						<u> </u>		15/2/3	,		<u> </u>	ŀ
	# Eggs / Time to hatch / # hatched		1						u 150 unha	Hohed 1125 Hohed 1125	F		
12668 C	# Males emerged				1 Dive	- 1		11					l
3	Male Time to Mortality (days)				60 0	24,2		7d 50	7	·····			ŀ
	# Females emerged							1	ŀ				
	Females Time to Mortality (days)					2d,117		49 1/3	40,10	6			
	Cumulative number emerged				2	4	-	19/5	78				
	# Pairings					1		1	10/60 gd/01				
	# Egg Case						1,272	.12		> (A)			
	# Eggs / Time to hatch / # hatched			<del> </del> -		<b>%</b>	229	المحدد الم	3	7) unha	check up	5.00	1
	Init./Date (1999)	13/11	11/12	11/13	11/14	11715	11/16	1147	19/18	11/19	11/20	11/21	1
ergence sco viving. P = p		any pu	ipae whi	ch die (E	before	emerge	ence. D	= dead 1	or flies v	which en	nerge bu	t åre no	t
atory: Aquatec	ring: Record	Actu	e hard	ing stil	ا مصد	ring 11/2	<b>&gt;</b>	ine like	Hen in	~46.°	ctd	ays21-31	,

Project: 99033 M-C Dead Creek BTR: 3641 Test Start: 10/21/99

Sample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12668 D	# Males emerged		!				11	1(	11 =	^		
	Male Time to		Cd			24	(mal)	ad ind	-60	4 11		
	Mortality (days)		5d			30/18	1 3 A	11/23	34 58			
	# Females		<del> ``</del>	<del> </del>	<del>                                     </del>	1,	1		1/10			
	emerged	j		]	1	}}	<b>)</b> }					}
	Females		<del> </del>	<del>                                     </del>	<del>                                     </del>	- \				<del>-</del>		<del></del>
	Time to Mortality			1		30,14	(Apples)					
	(days) Cumulative		<del> </del>	<del> </del>	<del>                                     </del>	- W	7		-JM		<del> </del>	<del> </del>
	number			}		1	5K	11000	910		į	
	emerged		<del> </del>	+	<del> </del>	10.00	, , , ,	100	7 ( 0			<del> </del>
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched			<del> </del>								
12668 E	# Males			1			, ,		۸.			
12000 L	emerged			1	-	1·	11		10	10.		1 1
	Male Time to			70,120		1 11	41 52		21./			70,1128
	Mortality (days)			11/1/2	1	30/11/18	43 50		00,7.8	00,119		40/1/28
	# Females emerged		ļ .	YsG			1					
	Females			<del> </del>	<del> </del> -	ļ <del></del>			ļ <del></del>			<del> </del>
	Time to Mortality					ļ	24,118					}
	(days)		<del> </del>	<del> </del>		ļ	D 11/10					ļ
	Cumulative number				ĺ				<b>{</b>	7		8
	emerged					<u>~</u>						0
	# Pairings						1		ĺ			
	# Egg Case											
	# Eggs /			<del> </del>			ļ		<del> </del>			<del> </del>
	Time to hatch /		1		1	ĺ			[			
	# hatched			ļ								
12668 F	# Males emerged				i1 1	1	'	1.		1		
			<u> </u>		777		<u> </u>	1	<u> </u>	37 6 11 4		ļ
	Male Time to Mortality		ļ	ł	1/20 1/26	NOT.	1	6d 1/13	Ge <sup>1</sup> 1/29	4d 4d 423 423	]	}
	(days)		ļ	<u> </u>	1130 1136	LSC.	[		0/112.	1457 1,152		ļ
	# Females emerged					11			1			
	Females	·	<u> </u>	<del> </del>	<del> </del>	lad at			1			
	Time to Mortality				1 /	30/1/34	1	{	(od 11/34	1	1	40-113
	(days) Cumulative		<del> </del>	<del> </del>	1	365	<del> </del> -		<del>- ///-</del>	010		
	number				121	11/11		5	( a	145"	1	11
	emerged	·	<del> </del>	<del> </del>	1001	141	<del> </del>		<u> </u>	1 P	<del> </del>	103
	# Pairings				`	W/668E			11			WING E
	# Egg Case						70				)°	
	, , ,		-	[			528				1~175	1.
	# Eggs /		<u> </u>				22 unha	ched		<u> </u>	0%har	ch,
	Time to hatch / # hatched						11/22	1		ļ	disation	ch ufa
		11/11	11/12	11/13	12/12	11/15	11/18	1/1/	11/18	11//19	11/20	11/21
	(1999)		KIKT	1. (+	ノし	124	1 / JAY	17/11	I UM	1/I/N	とり	+2KY

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa

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ctdays21-31

ample / Repl.	Response	21	22	23	24	25	26	27	28	29	30	31
12668 G	# Males emerged		3 (2 dive			1	(di	1	·	1		
	Male Time to Mortality		50 50	Mis		Adya	odille	61		60,1735		
	(days) # Females emerged		INIT III				1	142		1		
	Females Time to Mortality (days)					3d 1118	24/18			69"122		
	Cumulative number emerged		3	-		\$5	7			910	3	
	# Pairings					1	1 2 14 14 16 16 16 16 16 16 16 16 16 16 16 16 16			1		
	# Egg Case											-
	# Eggs / Time to hatch / # hatched											
12668 H	# Males emerged		1							1		
	Male Time to Mortality (days)		missing?							5d 11/24		
	# Females emerged		l WH	1				 	 			
	Females Time to Mortality (days)			Adjit		<u> </u>			<u> </u>			ļ
	Cumulative number emerged			12					<b></b>	3		
	# Pairings			m/668 #5		ļ 						
	# Egg Case				1 19 EST.							
	# Eggs / Time to hatch / # hatched				16 unhat							
	Init./Date (1999)	11/11	11/12	11/13	11/18	11/15	11/16 1M	1/1/2	1/1/18	11/19	11/20	11/21
ergence sco viving. P = p ents:	ring: Record	d any pu	upae whi	ch die (1	D) before	emerge	ence. D	=dead t	of flies	which en	nerge bu	ut are no
								<del>_</del>				
								<del></del>				
					·							

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ctdays21-31

#### Midge (Chironomus tentans) Chronic Toxicity Test Biological Monitoring

Project: 99033 M-C Dead Creek BTR: 3641 Test Start: 10/21/99

Sample / Repl.	Response	32	33	34	35	36	37	38	39	40	41	42
12668 A	# Males emerged										-	
	Male Time to Mortality (days)											
	# Females emerged								OL			
	Females Time to Mortality (days)								OP			
	Cumulative number emerged								11/29/			
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
12668 B	# Males emerged											
	Male Time to Mortality (days)											
	# Females emerged								OL			<u> </u>
- oni	Females Time to Mortality (days)			1					OP			
illy pair	Cumulative number emerged								11-7m			
	# Pairings	ا 										
	# Egg Gase	(a)								ļ		
	# Eggs / Time to hatch / # hatched	763 1200 Wh	1138									
12668 C	# Maies emerged	rzounn	Cheins	greting								
	Male Time to Mortality (days)											
	# Females emerged								OL			
	Females Time to Mortality (days)								OP			
	Cumulative number emerged								Magn			
	# Pairings											
	# Egg Case											
	# Eggs / Time to hatch / # hatched											
	Init./Date (1999)	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	12/1	12/2

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not surviving. P = pupa  $f = \frac{1}{2} R I B$ 

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ctdays32-42

Project: 99033 M-C Dead Creek BTR: 3641 Test Start: 10/19/99

Sample / Repl.	Response	1-24	22	23 34	<del>-24</del> 35	25	337	27	28	<del>-29</del> 40	<del>30</del> 41	31
12668 D	# Males	1 2	1-22	1 37		70	3/	J 3 C	37	40	-	42
12000 D	emerged				ļ	ļ						
	Male Time to Mortality		ĺ			1			,			
	(days) # Females		<del> </del> -	<del> </del>		<del> </del>	<del> </del>	<del> </del>	ļ			
	emerged								OL			
	Females				<del> </del>					L		
	Time to Mortality (days)				<u> </u>				09			
	Cumulative number								11/29m			Ì
	emerged	<u> </u>	<del>                                     </del>	<del> </del>	<del> </del>	<del> </del>	<u> </u>	ļ. ——	1 711		<del> </del>	<del> </del>
	# Pairings											
	# Egg Case											
	# Eggs /	<del> </del>			<del> </del>	<del>                                     </del>		<del> </del>	<del> </del>		-	
	Time to hatch / # hatched											
12668 E	# Males emerged	1	,									
	Male Time to Mortality	4d 11/26			1							
	# Females	<del>                                     </del>				<del> </del>		<del> </del>	6.			
	emerged								OL			
	Females Time to Mortality (days)								OP			
	Cumulative	9	-		<u> </u>	1	1	<del>                                     </del>	11/29			
	emerged number	1	<u> </u>		ļ	ļ	<u>.                                    </u>	ļ	مهلاً الله		<u> </u>	
	# Pairings											
	# Egg Case											
	# Eggs /					<del> </del>	<del>                                     </del>	<del>                                     </del>				
	Time to hatch / # hatched											
12668 F	# Males emerged											
	Male Time to			-	-	-	<del> </del>		<del> </del>		_	
	Mortality (days)					İ					}	ļ
	# Females emerged								67			
					<u> </u>	ļ <u>.</u>	<u> </u>	ļ	$\mathcal{V}$		ļ	ļ
	Females Time to Mortality								DP.	1		
	(days) Cumulative			<del> </del>	<del> </del>	<del> </del> -		<del>                                     </del>	11/6		<del> </del>	<del> </del>
	number emerged	·			ļ	Ì	ļ	1	11/29	]		1
	# Pairings				<del> </del>				130		<del> </del>	
	# Fall #193					ļ		ļ	<u> </u>			ļ
	# Egg Case											
	# Eggs /				<del> </del>		<del> </del>	<u> </u>		<del> </del> -		
	# cggs /	1										
	Time to hatch / # hatched					<u> </u>			<u> </u>		<u> </u>	

Emergence scoring: Record any pupae which die (D) before emergence. D = dead for flies which emerge but are not Emergence scoring: Record any pupae which die (D) before emergence. D = ueau for mos surviving. P = pupa = | 200 |

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

ctdays32-42

#### Midge (Chironomus tentans) Chronic Toxicity Test Biological Monitoring

Sample / Repl.	Response	21	22	23	24-	25	26 37	27 38	<del>28</del> 39	-29 40	30- 41	- 31 42
10000	# Maies	32	33	34	75	36	37	38	39	40	41	42
12668 G	emerged											
	Male Time to Mortality					<u> </u>						
	(days)	<u> </u>										
	# Females emerged	11				1			02			
	Females	<del>                                     </del>							-			<del> </del>
	Time to Mortality (days)	30,1125	l				ľ		OP :		ĺ	1
	Cumulative number	10 IN							11/1/29			
	amerced 1	1011		-	1	<del>\</del> -			11/01			<del> </del>
	# Pairings	Wholes E			14chi 30		İ				}	
the ban				10,150		<del> </del>					<del>                                     </del>	1
wir oail	# Egg Case			10/100	090	(x)	1					
110 1	# Eggs /			12/0	No. 113		<del></del>		<u> </u>		<del> </del>	<u> </u>
	Time to hatch / # hatched	]										
12668 H	# Males						1					1
	emerged				ļ	ļ						
	Male Time to Mortality	ļ									1	
	(days) # Females					<del> </del>		<del>                                     </del>	<u> </u>		<del> </del>	1
	emerged								02			
	Females Time to Mortality								00			
	(days) Cumulative								OP.			
	number emerged							}	111/29		]	
	# Pairings								<del>                                     </del>			1
	# Pairings					ļ <u>.</u>		ļ			ļ	<u> </u>
	# Egg Case	:										1
	# Eggs / Time to hatch /											
	# hatched	44400	4.4.00			11100	1110	111100	111100	11100	1011	10/0
	Init./Date	11/22	11/23	1,1/24 100	11/25	11/26	11/27	11/28	11/29	11/30	12/1	12/2
ergence sco viving. P = p			pae whi	die ([		e emerge	ence. D	= dead	for flies v	vhich er	nerge b	ut are n
nents:			••-									
		(*I) /	<u>2/1 → </u>	Could.	n't do	a do	y 7	m-				
		<del></del>	<u> na</u>	Hahing			299	·				
			<del></del>		ruse	is disc	arde	<u>d 11/3</u>	30			
	<del></del>											
		<del></del>	<del></del>									
<u> </u>												
	<del></del>			·	<del></del>						<del></del>	-
	<del></del>											

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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Test Dage

ctdays32-42

J 11/30/99

### Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ate: 10/17	No. of Egg Cas	es 2		
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use	
10/17	0	2075				
10/18	1	20-7				
10/19	2					
10/20	3					
10/21	4	22.5			C.T. Chan	id
	5					
Source of	egg cases:	Aguzrec cu	INES			

### Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ate: 10/18	No. of Egg Cas	es 8		
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use	·
10/18	0					
10/19	1					
10/20	2					
10/21	3	22.5			C.T. Chro	nice T
	4					)
	5					
Source of	egg cases:	Aquerec Cu	INRS			

## Collection of Chironomus tentans Egg Cases for Chronic Toxicity Tests

Egg Case	Deposit Da	ite: 10/29 36	No. of Egg Cas	es g	
Date (1999)	# Days Post- Deposit	Temperature (°C)	Feeding (Selenastrum)	Observations	Test Use
10/39	TG 0		~		
10/30	1				
10/31	2	23.1	V	Hatching	tux hales
/	3			Q	
	4				
	5				
Source of	egg cases:	Aquatec			

Sample Parameter 0 1 2 3 4 5 6 6 12665 T(°C) 22.7 22.7 22.7 22.7 22.7 22.7 22.7 22.							Day	Day of Analysis					
T (°C)   32.7   23.7   24.5   5							`						
T (°C)	Sample	Parameter	0	~	7		4		9	^	8	6	10
DO (mg/L)  Conductivity  DO (mg/L)  DO (mg/L)  DO (mg/L)  Conductivity  DO (mg/L)  DO (mg/L)  Conductivity	12665		22.7	22.7	3	de Cel	25.5 25.5 75.5 75.5 75.5	4,0	167	14/2	20.25	4.8	College College
DO (mg/L)  Conductivity  PH  T (°C)  DO (mg/L)  DO (mg/L)  Conductivity		Hd	7.7	7.8	6		46		4.5		45	1	10
Conductivity X X X X X X X X X X X X X X X X X X X		DO (mg/L)	7	8.0			5.5		2.0		0,7	1	
DO (mg/L)  DO (mg/L)  T (°C)  PH  Conductivity  T (°C)  PH  DO (mg/L)  DO (mg/L)  DO (mg/L)  T (°C)  T (°C)  DO (mg/L)  T (°C)		Conductivity 1	120052	×	×	×	×	×	×	330	×	×	×
23. 6.8 3. 6.8 × × × × × × × × × × × × × × × × × × ×	12668	l	73.1	37.8							234	8	
(6.8 × × × × × × × × × × × × × × × × × × ×		Hd	12	7.4			4.4				11		
		DO (mg/L)		8.9			80		6.2		20	1	
		Conductivity in	1	×	×	×	×	×	×	345	×	×	×
		(°C)											ļ
		Hd											
× × × × × × × × × × × × × × × × × × ×		DO (mg/L)											
× × × × ×		Conductivity		×	×	×	×	×	×		×	×	×
× × × ×		(°C)											
× × × ×		Hd											ļ 
× × × ×		DO (mg/L)											
		Conductivity		×	×	×	×	×	×		×	×	×
Init./Date (1999): 10/21, 19/22 19/23 19/24 19/25 19/26 10/27		Init./Date (1999):	10/21	19/37	19/23	42,027	1925	19/26	1987	19/28	10 88	15 88 88	15 E

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Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test.

Review: Date: 12/22/99 ctenvchr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

DAY 9 -- Setup Aux MAle beauers

000101

Project: Menzie-(	Project: Menzie-Cura & Associates	Pro	Project: 99	99033 Dea	Dead Creek	¥		BTR: 3	3529 Tes	Test Start	10/20/99	
						Day	Day of Analysis	lysis			P	
Sample	Parameter	11	12	13	14	15	16	17	18	19	20	21
12665	T (°C)	4	22.7	30 3/16	Silver	200	45.66	866/	B 3.5	4.50	23.3	4 4 12 12 12 12 12 12 12 12 12 12 12 12 12
	Hd	7,5		45		10/2			100	,	7.4	ì
	DO (mg/L)	6,3		4.7		15.5			40		40	
	Conductivity	×	×	×	39%	×	×	×	×	×	380	×
12668	T (°C) 1 P	•	8-cr								22.8	
	Hd	£'t		47		9%			2.8		7.5	
	DO (mg/L)	9,9		5,8		6.0			42		53	
	Conductivity	×	×	×	1/8/2	×	×	×	×	×	2/2	×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×		×	×	×	×	×		×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×	×	_	× /	×	×	×	×		×
	Init./Date (1999):	146-	11//Ph	11/8	11/4	11/5	11/6	11/1/N	11/8	17%	141801	13/34
Comments: Measured	Comments: Measured temperature is a measure	rement of	adeprese	ment of adepresentative beaker placed within the	aker place	d within th		ay Kor this t	lest array for this testing group	dn.		6

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, 40, and end of test. Review: Date: ( ) Date: ( ) Cannot the ctenychr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

(\*) lacks H - one emergent case was found on the water surface prior to talking 11/10/199 emergent rops 11/10/199

Sample Parameter 12665 T (°C) pH DO (mg/L) Conductivity T (°C)						Day	Day of Analysis	٩				
								ysis				
		22	23	24	25	26	27	28	59	30	31	32
		12,2	22.6	7.66 22.CE	23.4	83,8	32.5	256	33.8	23.0	22.9	33.6
		7.6			45		7,0	1.8				1,5
	J/Gu	9			0'9		5.2	8.3				17 0
	ctivity	×	×	×	×	×	×	1/0/2	×	×	×	×
	(၁	22,6	228	1.52	22.56	727	4.EC	822	23.0	23,1	23.5	27.4
Hd	-	76			75		4.4	76		,		4
DO (mg/L)	ıg/L)	0			<u>-</u>		5.5	97				10 B
Conductivity	ctivity	×	×	×	×	×	×	1/2/25	×	×	×	×
(2°) T	(C)											
Hď												
DO (mg/L)	ng/L)											
Conductivity	ctivity	×	×	×	×	×	×		×	×	×	×
(O <sub>o</sub> ) 1	(3)											
Hd	-											<u> </u>
DO (mg/L)	ıg/L)											
Conductivity	ctivity	×	×	×	×	×	×		×	×	×	×
Init./Date (1999):		如	11/13	1414	引品	11/16	以图	11/18	11/19	11/20	11/8/1	11/22
Comments: Measured temperature is a measurement of a representative beaker placed within the test array for this testing group	is a measur	ement of s	ı represer	fative bea	iker place	d within th	e test arra	y for this t	esting gro	up.	P	
Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly	ly, conductiv	ity once w	reekly. Cr	ollect amn	nonia, alka	linity, and	hardness	sambles (	on Days 0	, 14, 20, th	en weekly	

000163

Review: Date: ( ) Date: ( ) Control Colonia Sciences, South Burlington, Vermont

16/27/11

Date:

Midge (Chironomus tentans) Overlying Water Environmental Monitoring: Chronic Toxicity Tests

Project: Menzie-(	Project: Menzie-Cura & Associates	Proj	ect: 99	Project: 99033 Dead Creek	ad Cree	٧		BTR: 36	BTR: 3641 Test Start	t Start	10/21/99	
						Day	Day of Analysis	ysis				
Sample	Parameter	33	34	35	36	37	38	39	40	41	42	43
12665	(°C)	23.2	726	22.5	22,3	22.4	22.0	33.5	22.6	223	22.9	22,2
	Hd		ゲー	45				4		4.4	7.3	4.4
	DO (mg/L)		15	3.8				63		8		4,0
	Conductivity Atti/Phym.	×	×	330	×	×	×	×	×	×	340	×
12668	T (°C)	9.86	22.7	23.0	7.00	8°CC	22.5	22.8	1	(	(	(
	Hd		جر ب	74				4,	1	1	1	(
	DO (mg/L)		13	4.9					)	)	1	1
	Conductivity	×	×	340	×	×	×	33×	×	×	)	×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
	T (°C)											
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
	Init./Date (1999):	11/23	11/24	11/25	11/26	11127	-1,1/28 JAWA	8777	1438	13K	13/2	250
Comments: Measured	Comments: Measured temperature is a measurement of a representative beaker placed within the lest array for this testing group.	rement of	a represe	rifative bea	aker place	d within th	exest arra	y for this t	esting gro	ā		
Measure D.O. and pH.	Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness samples on Days 0, 14, 20, then weekly	vity once v	veekly.	Sollect am	nonia, alk	alinity, and	hardness	sambles	on Days 0	, 14, 20, th	nen weekl	

Review: Date: 12/12/99 ctenychr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

000164

						Day	Day of Analysis	lysis				
Sample	Parameter	44	45	46	47	48	49	20	51	52	53	54
12665	T (°C)	22,76										
	Hd	X 22	<u></u>									
	)∑(∏gm) OQ	047	/									
	Conductivity	×2 CZZ	×		×	×	×	×	×	×		×
12668	T (°C)		1	,								
	Hd											
	DO (mg/L)											,
	Conductivity	×	×		×	×	×	×	×	×		<u> </u>
	1 (°C)											
	Н											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
	(O°) T					ļ						
	Hd											
	DO (mg/L)											
	Conductivity	×	×		×	×	×	×	×	×		×
	Init./Date (1999):	124	12/5	12/6	12/7	12/8	12/9	12/10	12/11	12/12	12/13	12/14

Comments: Measured temperature is a measurement of a representative beaker placed within the test at ay in this testing group.

Measure D.O. and pH 3 times weekly, conductivity once weekly. Collect ammonia, alkalinity, and hardness at end of test for any samples ending.

Date: 12/11/49

Review Date: 12/2.1/99. ctenvchr.doc Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

# ALKALINITY AND HARDNESS

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	Alkalinity (mg/l)	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
12548									
	10/19/99	50	4.6	6.9	46	50	17.7	26.8	182.0
	11/8/99	50	28	29.6	32	30	0.2	3.7	116.7
	12/9/99	50	2.8	4.7	38	50	4.5	10.2	114.0
Avg					38.7				137.6
Min					32				114
Max					46				182
12550									
	10/19/99	50	9.1	11.2	42	50	36.7	45.7	180.0
	11/8/99	50	33	34.7	34	30	10.5	14.5	133.3
	11/29/99	50	25.2	26.8	32	50	4	8.2	84.0
Avg					36.0				132.4
Min					32				84
Max					42				180
12551									
	10/19/99	50	11.2	13.4	44	50	0.1	9	178.0
	11/8/99	50	36.6	38.2	32	30	18.5	21.8	110.0
	11/29/99	50	26.8	28.7	38	50	8.2	12.4	84.0
Avg					38.0				124.0
Min					32				84
Max					44				178
12552									
	10/19/99	50	13.4	15.9	50	50	9	19.6	212.0
	11/8/99	50	39.8	41.4	32	30	25.2	28.9	123.3
	12/3/99	50	32.4	33.9	30	50	0.2	5.9	114.0

Tuesday, December 21, 1999

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	Alkalinity (mg/l)	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
Avg					37.3				149.8
Min					30				114
Max					50				212
12592									
	10/19/99	50	21.6	23.6	40	50	18.2	27.5	186.0
	11/8/99	50	41.4	43.3	38	30	28.9	32.7	126.7
	12/6/99	50	35.5	37.1	32	50	11.1	16.8	114.0
Avg					36.7				142.2
Min					32				114
Max					40				186
12593					•				
	10/19/99	50	23.6	25.4	36	50	27.5	37.1	192.0
	11/8/99	50	43.3	45.1	36	30	32.7	36.9	140.0
	12/7/99	50	38.6	40.3	34	50	21.8	27.1	106.0
Avg					35.3				146.0
Min					34				106
Max					36				192
12609									
	10/19/99	50	25.4	27.5	42	50	37.1	46.6	190.0
	11/8/99	50	45.1	47.1	40	30	36.9	41	136.7
	11/30/99	50	21.9	23.7	36	50	41.8	46.3	90.0
	12/13/99	50	19.9	21.9	40	50	36.7	41.8	102.0
Avg					39.5				129.7
Min					36				90
Max					42				190
12611									
	10/20/99	50	34.2	35.8	32	50	6.7	12.1	108.0
	11/3/99	50	24.1	25.8	34	50	41.1	48.4	146.0
	11/9/99	50	41.5	43.1	32	50	6.4	13.2	136.0

Tuesday, December 21, 1999

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	Alkalinity (mg/l)	Hardness Volume (mls)		Final Titrant	Hardness (mg/l) -
	12/6/99	50	37.1	38.6	30	50	16.8	21.8	100.0
Avg					32.0				122.5
Min					30				100
Max					34				146
12612									
	10/20/99	50	35.8	37.5	34	50	12.1	17.7	112.0
	11/3/99	50	25.8	27.8	40	50	0.2	8.1	158.0
	11/9/99	50	43.1	44.5	28	50	13.2	20	136.0
	11/29/99	50	28.7	30.3	32	50	12.4	16.7	86.0
Avg					33.5				123.0
Min					28				86
Max					40				158
12613									
	10/20/99	50	37.5	39.2	34	50	17.7	23.6	118.0
	11/3/99	50	27.8	29.6	36	50	8.1	15.7	152.0
	11/9/99	50	44.5	46.2	34	50	20	26.9	138.0
	11/29/99	50	30.3	31.9	32	50	16.7	21	86.0
Avg					34.0				123.5
Min					32				86
Max					36				152
12614									
	10/20/99	50	0.1	1.8	34	50	23.6	29.1	110.0
	11/3/99	50	29.6	31.4	36	50	15.7	23.1	148.0
	11/9/99	50	46.2	47.6	28	50	26.9	33.3	128.0
	11/30/99	50	29.2	30.8	32	50	30.3	36.4	122.0
Avg					32.5				127.0
Min					28				110
Max					36				148
12622									

Tuesday, December 21, 1999

Sample Number	Date	Alkalinity Volume (mls)		Final Titrant	Alkalinity (mg/l)	Hardness Volume (mls)		Final Titrant	Hardness (mg/l)
								<del></del>	
	10/20/99	50	4.2	6.1	38	50	34.4	39.7	106.0
	11/3/99	50	33.1	34.9	36	50	29.5	36.9	148.0
	11/9/99	50	48.8	50	24	50	38.8	45.3	130.0
	12/2/99	50	30.8	32.4	32	50	36.4	41.5	102.0
Avg					32.5				121.5
Min					24				102
Max					38				148
12665									
	10/21/99	50	6.1	7.6	30	50	0.5	6.1	112.0
	11/10/99	50	25	26.8	36	50	33.4	40.8	148.0
	11/18/99	50	20.2	22.1	38	50	22.5	30.2	154.0
	12/4/99	50	33.9	35.5	32	50	5.9	11.1	104.0
Avg					34.0				129.5
Min					30				104
Max					38				154
12668									
	10/21/99	50	7.6	9.7	42	50	6.1	11.3	104.0
	11/10/99	50	29.4	31	32	50	5.6	13	148.0
	11/18/99	50	25.6	27.3	34	50	0	6.8	136.0
	11/29/99	50	23.7	25.2	30	50	0	4	80.0
Avg					34.5				117.0
Min					30				80
Max					42				148

Client: Menzy-Cura	Project: 99033	BTR: 3615
Sample Description: ,	Davi () 10/19	
	<del></del>	

					$\bigcup$						•
				ALKA	LINITY			HARD	NESS		
			Sample	Titrant	Titrant	Analyst	Sample	Titrant	Titrant	Analyst	Data
	Sample ID	Sample Date	Vol.	Init. Vol.	Final Vol.	Date/ Init.	Vol.	Init. Vol.	Final Vol.	Date/ Init.	entered Init.
1	12546		50.1	02	2.3	12/2 48	6.1	101	11.6	12/7 48	12/21/28
}	47	10/19	50ml	2.3	4.6	10/28	35 MJ	11.6	17.7	1177 + 95	192133
į	48		<del></del>	4.6	6.9			17.7	26.8		
	1 49			6.9	Q. 1	-	50m/	26.8	30.7		
Ì	.50			91	77	1		30.7	45.7	<del> </del>	<u> </u>
	51			11.2	B.4	1-1		0	92		
	150			13.4	159	-		9.0	19.6		
	<u> سیر کر کر ا</u> ا			10.4	12.			19.0	19.0		
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12/8/99

Client: Menzie-Cura	Project:	99033		BTR:	3622	
Sample Description: ]	Day D	H.a	10/19			

ALKALINITY **HARDNESS** Sample Titrant Titrant Analyst Sample Titrant Titrant Analyst Data Sample Sample Vol. init. Final Date/ Vol. Init. Final Date/ entered 1D Date Vol. Vol. Init. Vol. Vol. Init. Init. 5.9 50ml 17.8 وين حراحا 12/7 48 10/19 12/21 YX 90 91 921 \* 103 \* 12609

12/8/99

\*: et

	Client	: Mens	zie-Cu	ra P	roject:	99	033	BTŖ	: 50	cupl	
	Samp	le Des	Pie Cu cription	1: /)	au O	H	. a +C	T10/2	<u>'</u>		
	·				<u> </u>	Ch	ronic				
,				ALKA	LINITY				NESS		
ЛΤ	Sample	Sample	Sample Vol.	Titrant Init.	Titrant Final	Analyst Date/	Sample Vol.	Titrant Init.	Titrant Final	Analyst Date/	Data entered
C.T. ISO	ID	Date	VOI.	Vol.	Vol.	Init.	VOI.	Vol.	Vol.	Init.	Init.
	12589   90	10/20	50ml	22.5	24.3	12/8 48	50m	14.8	20.6	PKY	13/8/45
	90			24.3	26.1		7	20.0	26.6		
	91		<b> </b>	26.1	27.7		40m	26.6	35.0		
48*	192 193		25.4	27.7	29.4		Donl	35.0 37.3	37.3		
43.* 43.* 43.*	12609		25ml	29.4 30.3	30,3 32.3		30m	110	40,1		
Y3/#	121001		50m	32.3	34.2		40m	0.2	6.7		
*	(011			342	358		50ml	10.2	12.1		
*	612			35.8	375			12.1	17.7		
*	413			37.5	392			17.7	23.6		
*	1014			0.1	18		-	23.6	29.1		
	1015			1.8	4.2		40 m	29.1	34.4		
*	1 622		<u> </u>	4.2	lo.1	<u> </u>	50m)	34.4	39. F	<u> </u>	_ <del></del> _
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Client: Man 218 - Cura Project: 9.9033 BTR: Several Sample Description: Day O

				ALKA	LINITY			HARD	NESS		
	Sample	Sample	Sample Vol.	Titrant Init.	Titrant Final	Analyst Date/	Sample Vol.	Titrant Init.	Titrant Final	Analyst Date/	Data entered
	ID	Date	VO	Vol.	Vol.	Init.	<b>V</b> OI.	Vol.	Vol.	Init.	Init.
	12665	10/21	50ml	6.1	7.6	2/848	Dnu	0.5	6.1	12/8 yg	14848
3	12008	1_	1	7.6	9.7	Ţ	I	6.1	11.3	L	
	12664	1022	50ml	9.7	11.2	P/8 /8	50ml	11.3	173	12/848	
	665			11.2	13.1		<b></b>	17.3	22.8 28.2		
٠	10166			/3./	15.0			22.8	28.2		
	668			15.0	18.3			28.2	33.1		
	1671		+	16.6	18.3			33.1	38.0	!-	
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Client: Menzie Cura Sevent Project: BTR: 99033 Sample Description: + Ct. **ALKALINITY** HARDNESS Data 🛎 Sample Titrant Titrant Titrant Titrant Analyst Analyst Sample \* used Sample Final Date/ entered. Sample Vol. Init. Final Date/ Vol. Init. BUNI sample ID Date Vol. Init. Init. Vol. Vol. Init. Vol. 12/8/43 546 <u>गिक्रप्र8</u> Ha. 11/8 11/30 45 30ml (norming out 50ml of Calgarite 210.0 28.0 C.+. Ha 33.0 34.7 C.t. 36.6 Ha. c.+. Ha. 41.4

Client: Men Decural Project: 99033 BTR: Scient Sample Description: Day 20

				ALKA	LINITY			HARD	NESS		
			Sample	Titrant	Titrant	Analyst	Sample	Titrant	Titrant	Analyst	Data
	Sample ID	Sample Date	Vol.	Init. Vol.	Final Vol.	Date/ Init.	Vol.	Init. Vol.	Final Vol.	Date/ Init.	entered Init.
H.a	12589		50ml	323	33.9	M20 18	50ml	17.0	23.1	11/2015	12/8 48
	12590	11		33.9	35.3	\		23.1	~8.8 34.3		
	12592	$-\mathbb{L}$		35.3	36.7			28.8	34.3		
	12593			36.7	38.1			34.3	405		
	12609			38.1	39.9			40.5	46.7	-	
	12610			39.9	41.5			0.0	10.4		
ct.	12611			41.5	43.1			6.4	13.2		
	12/013			42.1	46.2			13.2	20.0		
	12/014			46.2	47.6			200	333		
H.a.	12615			47.10	48.8			26.9 33.3	38.8		
c.+	12622			47.6 48.8	50.0	4	ユ	38.8	45.3		
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Client: Muzie-Cura Project:	11000	DIT.	Severa	
Sample Description: 124 20	)	·		

ALKALINITY		L										
Sample   Sample   Date   Vol.   Init.   Final   Date   Vol.   Init.   Vol.   Init.   Final   Date   Init.   Vol.   Init.   Vol.   Init.   In					ALKA	LINITY			HARD	NESS		
Ha					Init.	Final	Date/		Init.	Final	Date/	entered
Ha    2805   11   11	HΩ			50-1			11120	Foul				
C+   12805   1   10   25.0   210.8   33.4   40.8				<u>Unu</u>			1	1			, , , ,	70.93
Ha 1286 11 11 26.8 38.3 40.8 46.9 4 1268 11 10 28.3 29.4 0.1 5.6 13.0 40.8 1267 11 11 11 11 11 11 11 11 11 11 11 11 11				<del></del>			-		23.4			
HA 1268 II II 28.3 29.4 31.0 5.6 13.0 HA. 1267 II II II V 31.0 32.3 - 13.0 19.4 -							1		·			
Ct. 12(68   11   10   29.4   31.0   5.6   13.0   14.4   12.67   11   11   11   29.4   31.0   32.3   13.0   19.4   1   1   1   1   1   1   1   1   1		12668				294			0.1			
Ha. 12671 II II V 31.0 32.3 + 173.0 19.4 - 1		121do8			29.4				56			
	Ha.	12671			31.0	323	-		13.D		工	1_
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Client: Menzie-Cura	Project:	99033	ВТ	R: Several	
Sample Description:		KMU C	test	end	

				ALKA	LINITY			HARD	NESS		
Day	Sample ID	Sample Date	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Sample Vol.	Titrant Init. Vol.	Titrant Final Vol.	Analyst Date/ Init.	Data entered Init.
41	121014	1130	50 ml	29.2	30.8	148 VS	50ml	30.3	30.4	12/843	:48 48
	121022	12/2		32,7	32.4			36.4	41.5		
48	1210105	12/6		35.9 35.5	35.5 37.1			5.9 ][.]	16.8		
47	12611	12/6	<del></del>	37.1 38.6	38.4 40.3	1	<u> </u>	116.8	27.1		
						,					

Client: Menzie-Cura	Project:	99 033	BTR: Several
Sample Description: (	It test	end	

**ALKALINITY HARDNESS** Titrant Sample Titrant Titrant Analyst Sample **Titrant** Analyst Data Sample Sample Vol. Vol. Init. Final Date/ entered Init. Final Date/ ID Date Init. Vol. Init. Init. Vol. Vol. Vol. 142148 12/948 50ml 12/9 43 1219 50ml

Client: Menzil-Cura	Project:	99033	BTR:	Several	
Sample Description:	71st en	a C.t.			

			ALKA	LINITY			HARD	NESS		
		Sample	Titrant	Titrant	Analyst	Sample	Titrant	Titrant	Analyst	Data
Sample	Sample	Vol.	Init.	Final	Date/	Vol.	Init.	Final	Date/	entered
ID	Date		Vol.	Vol.	Init.		Vol.	Vol.	Init.	Init.
12/009	12/13	50	19.9	21.9	12/21/28		36.7	41.8	12/21/2	14/2148
12609	11/30	50	21.9	23.7	la al Tm	50	41.8	46.3	12/21TM	
12668	11129	50	23.7	25.2	ialai Tm	50	0.0	4.0	19/31 JM	
12550	11/29	50	25.2	26.8	12/21 Tm	50	4.0	8.2	12/21 TM	
12551	11/29	50	26.8	28.7	alaitim	50	8.2	12.4	12)21m	
	11/29	50	28.7	30.3	METICA		12.4	16.7	12 21 IM	
12613	1129	50	30.3	31.9	ia) ai Tom		16.7	21.0	12/21TM	
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Sample Number	Client Sample Identifier	Species	Date	Ammonia Concentration (mg/l)	
12548	BTOX-C-3	СТ	11/30	0.1	
12548	BTOX-C-3	СТ	12/9	0.5	
12548	BTOX-C-3	1N	10/19	4.1	
12548	BTOX-C-3	СТ	11/16	0.6	
12548	BTOX-C-3	СТ	11/8	2	
		Avg: 1.4	6 Max: 4.	1 · Min: 0.1	
12550	BTOX-D-2	СТ	11/16	0.4	
12550	BTOX-D-2	СТ	11/8	0.2	
12550	BTOX-D-2	СТ	11/29	0.5	
12550	BTOX-D-2	IN	10/19	2.2	
		Avg: 0.8	3 Max: 2.	2 Min: 0.2	
12551	BTOX-D-3	СТ	11/8	0	
12551	BTOX-D-3	IN	10/19	1.5	
12551	BTOX-D-3	СТ	11/29	0.5	
12551	BTOX-D-3	СТ	11/16	0.1	
		Avg: 0.5	3 Max: 1.	5 Min: 0	
12552	HA LCS	СТ	11/8	0.7	
12552	HA LCS	СТ	11/16	0.1	
12552	HA LCS	IN	10/19	0.2	
12552	HA LCS	СТ	11/30	0	
12552	HA LCS	CT	12/3	0.1	
		Avg: 0.2.	2 Max: 0.	.7 Min: 0	
12592	BTOX-B-3	СТ	11/16	0	
12592	втох-в-з	СТ	10/19	1.6	

Page 1 of 4

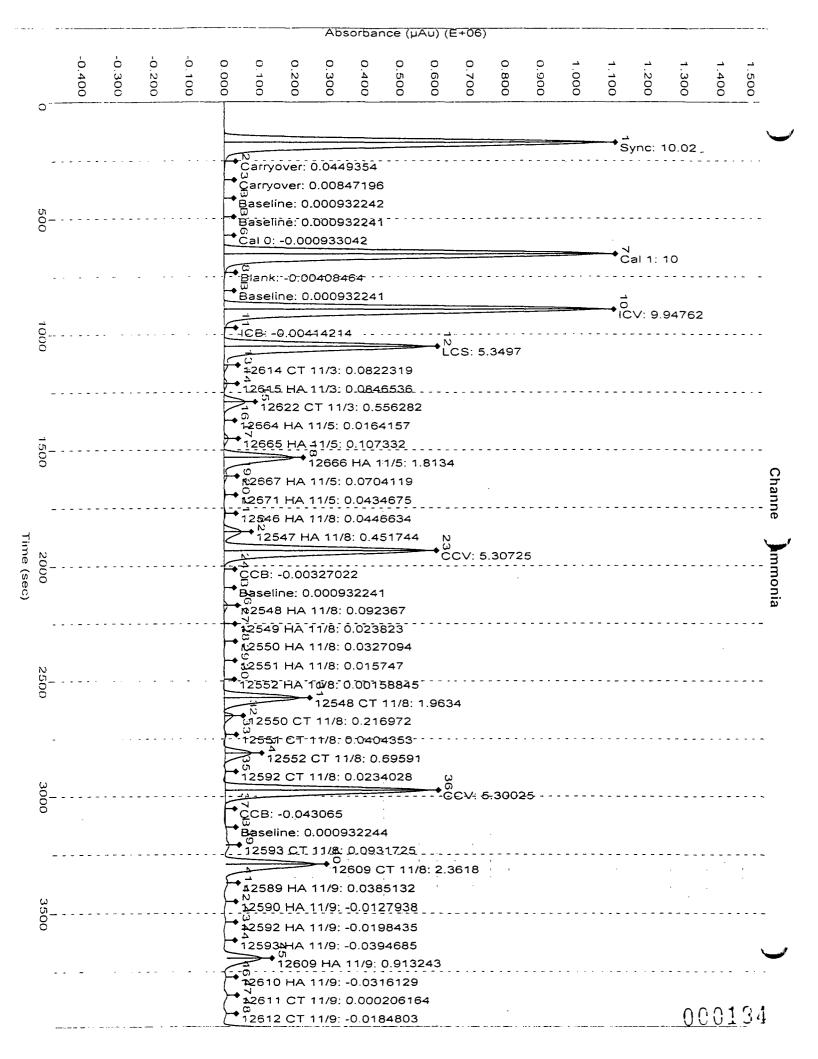
Sample Number	Client Sample Identifier	Species	Date	Ammonia Concentration (mg/l)
12592	BTOX-B-3	СТ	12/6	0.1
12592	BTOX-B-3	СТ	11/30	0
12592	BTOX-B-3	СТ	11/8	0.1
		Avg: 0.38	Max: 1.6	6 Min: 0
12593	BTOX-M	СТ	11/16	0.1
12593	втох-м	СТ	11/30	0.1
12593	втох-м	СТ	11/8	0.1
12593	втох-м	СТ	10/19	3
12593	BTOX-M	СТ	12/7	0,1
		Avg: 0.68	Max: 3	Min: 0.1
12509	E-1 DEAD CREEK	СТ	11/30	0.6
12609	E-1 DEAD CREEK	СТ	11/16	1.6
12609	E-1 DEAD CREEK	СТ	11/8	2.4
12609	E-1 DEAD CREEK	СТ	12/13	0.5
12609	E-1 DEAD CREEK	CT	10/19	0.1
		Avg: 1.04	Max: 2.4	Min: 0.1
12611	E-3 DEAD CREEK	СТ	10/20	2.9
12611	E-3 DEAD CREEK	СТ	12/6	0.2
12611	E-3 DEAD CREEK	СТ	11/17	0.1
12611	E-3 DEAD CREEK	СТ	11/9	0
		Avg: 0.8	8 Max: 2.9	9 Min: 0
12612	BP-1 BORROW PIT	СТ	11/9	0
12612	BP-1 BORROW PIT	CT	11/17	0 1
12612	BP-1 BORROW PIT	СТ	10/20	0 6

Page 2 of 4

Sample Number	Client Sample Identifier	Species		Date	Ammonia Concentrati	on (mg/
12612	BP-1 BORROW PIT	СТ		11/29		0.5
		Avg:	0.3	Max: 0.6	Min: 0	
12613	BP-1(DUPE) BORRO	СТ		11/9		0.1
12613	BP-1(DUPE) BORRO	СТ		10/20		0.8
12613	BP-1(DUPE) BORRO	CT		11/29		0.5
12613	BP-1(DUPE) BORRO	СТ		11/17		0.1
		Avg:	0.38	Max: 0.8	Min: 0.1	
12614	BP-3 BORROW PIT	СТ		11/3		0.1
12614	BP-3 BORROW PIT	СТ		11/17		0
12614	BP-3 BORROW PIT	CT		11/30		0
12614	BP-3 BORROW PIT	СТ		11/9		0
12614	BP-3 BORROW PIT	СТ		10/20		1
		Avg:	0.22	Max: 1	Min: 0	
12622	LCS	СТ		10/20		0.1
12622	LCS	СТ		11/17		0
12622	LCS	СТ		11/9		0.1
12622	LCS	СТ		11/3		0.6
12622	LCS	CT		12/2		0
		Avg:	0.16	Max: 0.6	Min: 0	
12665	PRAIRIE DUPONT CR	СТ		10/21		0.1
12665	PRAIRIE DUPONT CR	СТ		11/10		0.2
12665	PRAIRIE DUPONT CR	СТ		12/4		0.2
12665	PRAIRIE DUPONT CR	СТ		11/18		0.2

Page 3 of 4

Sample Number	Client Sample Identifier	Species	Date	Ammonia Concentration (mg/l)	
		Avg: 0	.18 Max: 0.2	Min: 0.1	
12668	LCS: 10/8/99@:(SE	СТ	11/29	0.5	
12668	LCS: 10/8/99@:(SE	СТ	10/21	0.1	
12668	LCS: 10/8/99@:(SE	СТ	11/10	0.3	
12668	LCS: 10/8/99@:(SE	СТ	11/18	0	
		Avg: 0	.23 Max: 0.5	Min: 0	



Peak Table: ammonia

File name: F:\FLOW\_4\112399B.RST Date: Unknown

Operator: LKS

w.k	Cup	Name	Type Dil	Wt	H	leight	Calc. (mg/L)
1	2	Sync	SYNC	1	1	1080420	10.019993
2	Ō	Carryover	CO	1	1	4745	0.044935
3	Ö	Carryover	CO	ī	1	813	0.008472
В	0	Baseline	RB	1	î	0	0.000932
В	Ö	Baseline	RB	ì	1	0	0.000932
6	ĺ	Cal 0	C	ì	ì	-201	-0.000933
7	2	Cal 1	C	i	i	1078264	10.000000
8	0	Blank	Ū	ī	ī	-541	-0.004085
3	Ö	Baseline	RB	i	1	0	0.000932
10	2	ICV	Ū	ī	ī	1072615	9.947621
11	1	ICB	Ū .	ī	1	-547	-0.004142
12	3	LCS	Ū	ī	ī	576792	5.349701
13	91	12614 CT 11/3	Ū	ī	ī	8767	0.082232
14	92	12615 HA 11/3	Ū	ī	ī	9028	0.084654
15	93	12622 CT 11/3	Ū	ī	1	59887	0.556282
16	94	12664 HA 11/5	Ū	ī	_ 1	1670	0.016416
17	95	12665 HA 11/5	Ū	ı 1	ī	11474	0.107332
18	96	12666 HA 11/5	Ū	ī	1	195450	1.813402
19	97	12667 HA 11/5	บั	1	<u>1</u>	7492	0.070412
20	98	12671 HA 11/5	Ū	ī	ī	4587	0.043467
21	99	12546 HA 11/8	Ū	ī	1	4716	0.044663
22	100	12547 HA 11/8	บี	ī	1	48614	0.451744
23	3	CCV	Ū	ī	ī	572214	5.307250
	1	CCB	Ū	ī	1	-453	-0.003270
	0	Baseline	RB	ī	ī	0	0.000932
26	101	12548 HA 11/8	Ū	ī	1	9860	0.092367
27	102	12549 HA 11/8	บ	1	1	2468	0.023823
28	103	12550 HA 11/8	Ü	1	1	3427	0.032709
29	104	12551 HA 11/8	Ū	1	1	1598	0.015747
30	105	12552 HA 11/8	Ŭ	1	1	71	0.001588
31	106	12548 CT 11/8	U	ı	<u>1</u>	211625	1.963397
32	107	12550 CT 11/8	U	l	1	23297	0.216972
33	108	12551 CT 11/8	U	<u>1</u>	1	4260	0.040435
34	109	12552 CT 11/8	U	1	1	74944	0.695910
35	110	12592 CT 11/8	U	1	1	2423	0.023403
36	3	CCV	U	1	<u> 1</u>	571459	5.300246
37	1	CCB	U	1	<u>7</u> ·	-4745	-0.043065
3	0	Baseline	RB	1	1 1 1	0	0.000932
39	111	12593 CT 11/8	U	1 1	1	9947	0.093172
40	112	12609 CT 11/8	U		1	254588	2.361800
41	113	12589 HA 11/9	Ŭ	1	1	4053	0.038513
42	114	12590 HA 11/9	U	1	1	-1480	-0.012794
43	115	12592 HA 11/9	U	l	1	-2240	-0.019844
44	116	12593 HA 11/9	Ŭ	1	1	-4357	
45	117	12609 HA 11/9	U	1	ı	98380	0.913243
46	118	12610 HA 11/9	U	1	l	-3510	-0.031613
47	119	12611 CT 11/9	U	1	1	-78	
48	120	12612 CT 11/9	Ŭ	1	1	-2093	-0.018480



Peak Cup Flags 1 2

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	-0.600	-0.400	-0.200	0.000	0.200	0.400	0.600	0.800	1.000	1.200	1.400	1.600	1.800	2.000	2.200
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													Cal 1:	10	
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					12548	CT 11/	30: 0.0	955395							
	<b></b> .				4 12552 ( 10 12592 (	CT 44/3	30:0.04	108047.							<del>-</del>
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7					1260	9 CT 1	1/30° 0	,5 <u>5703</u>	8						
<u> </u>				-	±2614 €	OT 11/3	30: 0.04	20547	P						<u>-</u>
					ს 12592 (										
		<b></b>			0 02552 (	CT_12/3	3: 0.09	1506							<b>-</b>
				-	- 1 <u>2</u> 622 (	CT 12/2	2: 0.046	082							•
	•				12665	CT 12/	4: 0.19	0228	N W						
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				<u> </u>	Reseline 0 1 <sub>1</sub> 2592 (										
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5					CCB: -0	0.00264	1392			. 0.000	-				
					ာ Bas <b>မျ</b> ine	e: 0.00	127833	3							
					<u>&gt; ⊀</u> 233	02-CT-	1.1/23:	0.7293	16						
				$\geq$	<del></del>			.415799							
۵				2	1330	04 CT 1	1/23: 0	0.53933	4 E						
3500					<u> </u>				. TC.C.V	/: 5. <u>4</u> 00	25		. <del>-</del> .	-	
ٺ				1 4	CCB: -0										
					Baselin	€. U.UU	12/03	•						00	0196

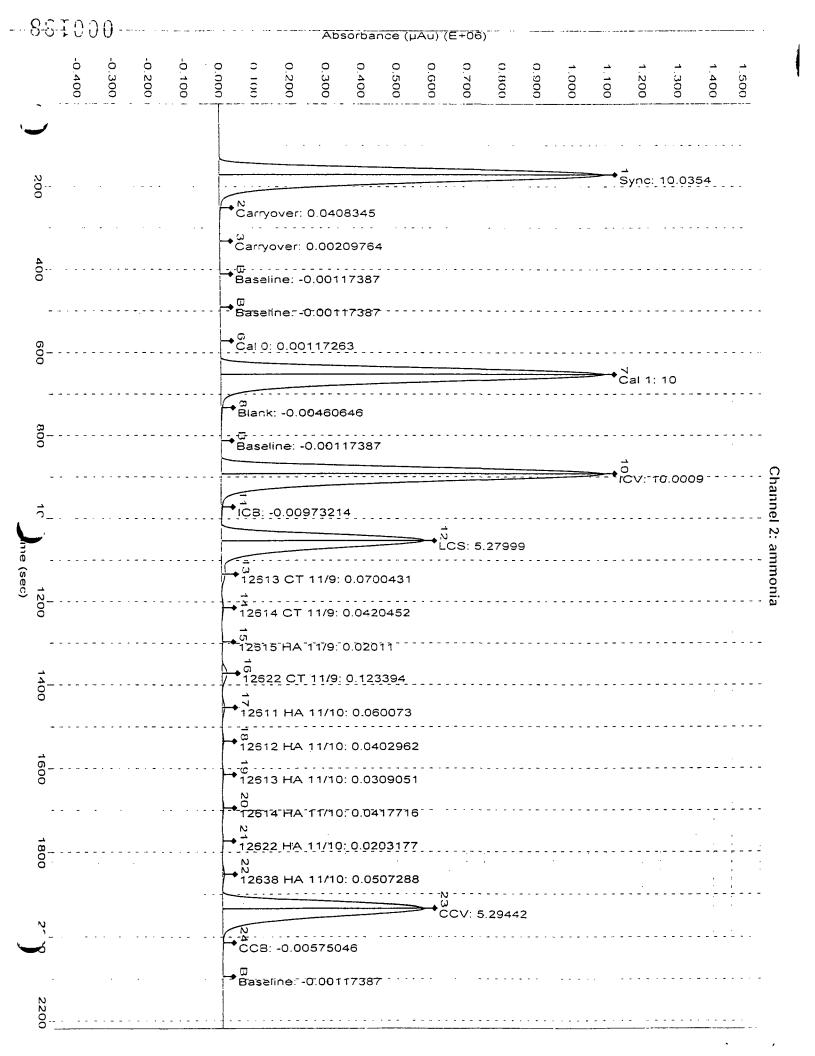
Peak Table: ammonia

File name: E:\FLOW\_4\120799C.RST Date: December 08, 1999

Operator: nvw

,	-k	Cup	Name	Type Dil	Wt	:	Height	Calc. (mg/L)
	1	2	Sync	SYNC	1	1	1606045	9.817476
	2	0	Carryover	CO	ī	1	14980	0.092836
	3	Ö	Carryover	CO	ī	1	408	0.003769
	В	Ö	Baseline	RB	ī	ī	0	0.001278
ŀ	B	Ö	Baseline	RB	ī	1	Ō	0.001278
	B 6	1	Cal 0	C	ī	1	-418	-0.001279
	7	2	Cal 1	C	ī	1	1635908	10.000000
	8	0	Blank	Ū	ī	1	-484	-0.001681
	B	Ö	Baseline	RB	ī	1	0	0.001331
	10	2	ICV	Ū	ī	1	1642269	10.038879
	11	1	ICB	Ū	1	1	-762	-0.003378
	12	3	LCS	ប	1	i	852135	5.209557
	13	91	12548 CT 11/30	Ū	1	1	15422	0.095540
	14	92	12552 CT 11/30	Ū	i	1	6467	0.040805
	15	93	12592 CT 11/30	Ū	ì	<u>.</u> 1	7211	0.045350
	16	94	12593 CT 11/30	Ü	1	1	10855	0.045350
	17	95	12609 CT 11/30	ָט	1		90929	0.557038
_	18	96	12609 CT 11/30 12614 CT 11/30	Ū	1	1	6671	0.042055
	19	97	12514 CT 11/30 12592 CT 11/8	บ	<u>1</u>	는 다 다 다 다		0.042055
	20		•			<u>.</u>	10151	
	21	98 99	·	U	] ]	<u>.</u>	14762	0.091506
	21 22			U		÷	7330	0.046082
	7 Z	100	12665 CT 12/4	U	1	<u> </u>	30914	0.190228
		3	CCV	Ū	1	7	865826	5.293231
7	1441	1	CCB	U	1	1	-548	-0.002069
	D C	0	Baseline	RB	1	j	0	0.001278
		101	12592 CT 12/6	Ū	1	j	12179	0.075719
	27	102	12611 CT 12/6	Ŭ 	1	1	28157	0.173374
	28	103	12593 CT 12/7	U	1	j	9644	0.060220
	29	104	13300 HA 11/24	Ū	1	1	23518	0.145023
		105	13301 HA 11/24	U	1	1	32980	0.202855
		106	13302 HA 11/24	U	1	J	13684	0.084914
		107	13303 HA 11/24	Ū	1	l	20970	0.129446
		108	13304 HA 111/24	Ū	1	1	47333	0.290581
		109	13300 CT 11/23	Ŭ	l	l	93049	0.569995
	35	110	13301 CT 11/23	Ü	l	ī	98237	0.601708
	36	3 1	CCV	U	1	1	880958	5.385724
	37		CCB	ָּט 	1	7	-642	-0.002644
	В	Э	Baseline	RB	ı	1	0	0.001278
		111	13302 CT 11/23	U	1	<u>1</u>	119116	0.729316
		112	13303 CT 11/23	U	1 1 1	1	67820	0.415799
	41	113	13304 CT 11/23	U	1	1	98032	0.539333
	42	3	CCV	U	1	<u>7</u>	883335	5.400253
	43	1	CCB	Ū	l l	1 1 1 1 1 1 1 1 1 1	-618	-0.002497
	B	0	Baseline	RB	1	1	C	0.001278

Peak	Cup	Flags
·		
	2	
2	0	
3	0	
B	0	BL
B	0	BL



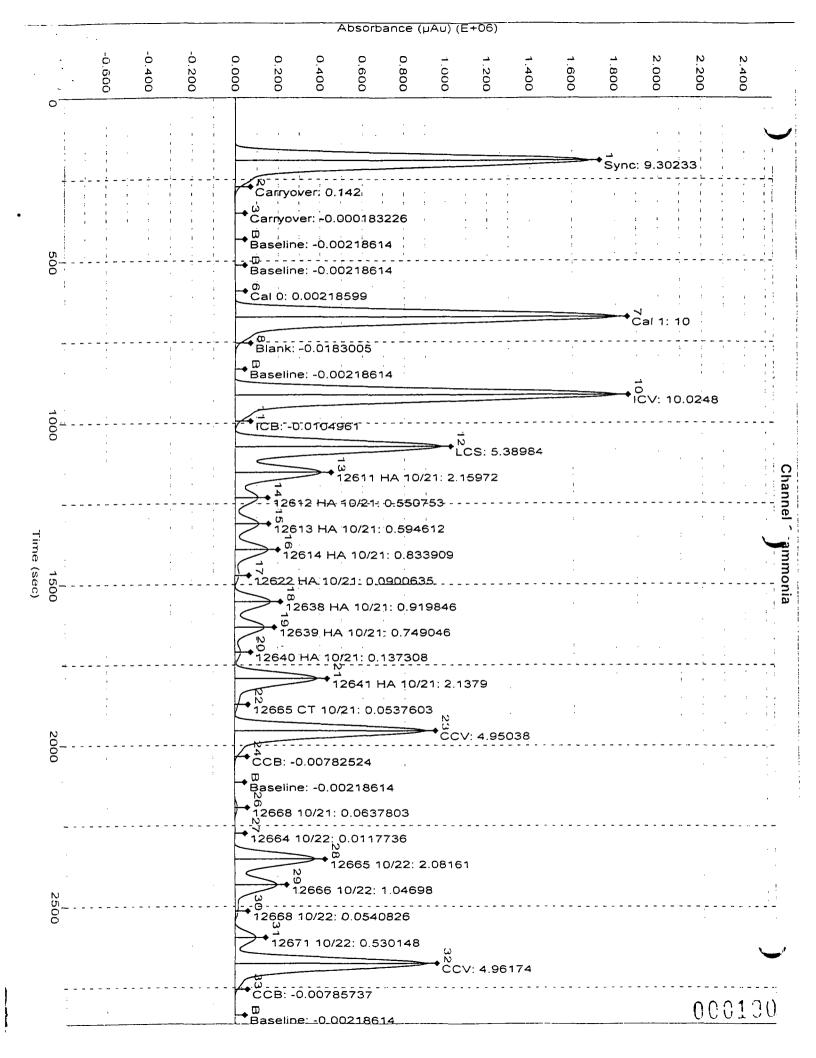
Peak Table: ammonia

File name: F:\FLOW\_4\112399B1.RST Date: November 23, 1999

Operator: NVW

k	Cup	Name	Type Dil	Wt		Height	Calc. $(mg/L)$
 1	2	Sync	SYNC	1	1	1092316	- 10.035433
2	0	Carryover	CO	1	1	4572	0.040835
3	0	Carryover	CO	1	1	356	0.002098
В	0	Baseline	RB	1	1	0	-0.001174
В	0	Baseline	RB	1	1	0	-0.001174
6	1	Cal 0	С	1	1	255	0.001173
7	2	Cal 1	С	1	1	1088460	10.000001
8	0	Blank	U	1	1	-374	-0.004606
Ξ.	0	Baseline	RB	1	1	0	-0.001174
10	2	ICV	Ū	1	1	1088557	10.000895
<u> 1 1                                 </u>	1	ICB	U	1	1	-931	-0.009732
12	3	LCS	Ū	1	1	574766	5.279994
13	10	12613 CT 11/9	Ü	1	1	7751	0.070043
14	11	12614 CT 11/9	Ū	1	1	4704	0.042045
15	12	12615 HA 11/9	U U	1	1	2316	0.020110
16	13	12622 CT 11/9	Ū	1	<u>1</u>	13557	0.123394
17	14	12611 HA 11/10	Ū	1	1	6666	0.060073
18	15	12612 HA 11/10	Ŭ	1	1	4513	0.040296
19	16	12613 HA 11/10	Ū	l	1	3491	0.030905
25	<u> 1</u> 7	12614 HA 11/10	Ū	1	1	4674	0.041772
21	18	12622 HA 11/10	Ū	1	<u>1</u>	2339	0.020318
22	19	12638 HA 11/10	U	1	1	5649	0.050729
23	3	CCV	Ū	1	1	576336	5.294418
W	1	CCB	Ū	<u>1</u>	l	-498	-0.005750
	0	Baseline	RB	1	1	0	-0.001174

Peak	quO	Flags
9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	2	
2	0	
3	0	BL
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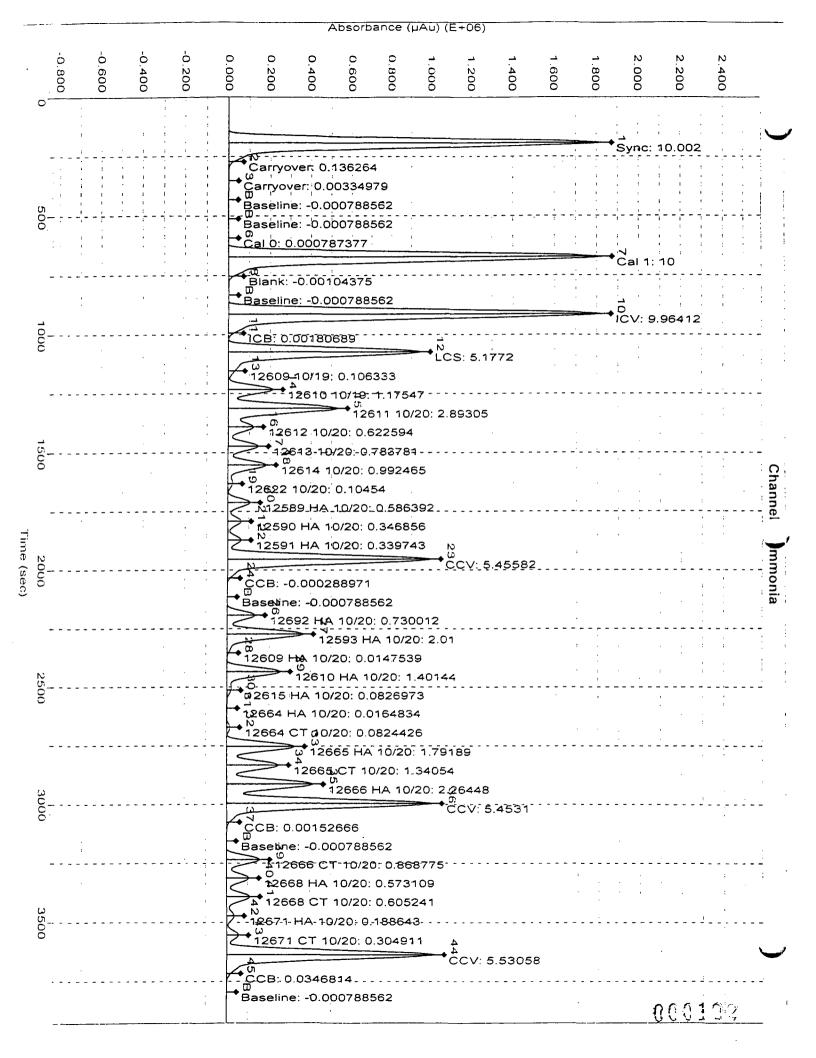


Peak Table: ammonia

File name: F:\FLOW\_4\102799F.RST Date: October 28, 1999 Operator: NVW

Wak	Cup	Name	Type Dil		Wt	Height	Calc. (mg/L)
1	2	Sync	SYNC	1	1	1683774	9.302330
2	0	Carryover	CO	1	1	26092	0.142000
3	0	Carryover	CO	1	1	362	-0.000183
3	0	Baseline	RB	1	1	0	-0.002186
3	0	Baseline	RB	1	1	0	-0.002186
6	1	Cal 0	С	1	ı	791	0.002186
7	2	Cal 1	С	1	1	1810026	10.000000
8	0	Blank	Ŭ	1	1	-2916	-0.018301
3	0	Baseline	RB	1	1	0	-0.002186
10	2	ICA	U	1	1	1814510	10.024775
11	1	ICB	U	1	1	-1504	-0.010496
12	3	LCS	U	1	1	975757	5.389835
13	91	12611 HA 10/21	Ū	1	1	391225	2.159720
14	92	12612 HA 10/21	U	1	1	100062	0.550753
15	93	12613 HA 10/21	U	1	1	107998	0.594612
16	94	12614 HA 10/21	U	1	ı	151302	0.833909
17	95	12622 HA 10/21	U	1	1	16694	0.090064
18	96	12638 HA 10/21	U	<u>1</u>	1 1 1	166854	0.919846
19	97	12639 HA 10/21	U	1		135945	0.749046
20	98	12640 HA 10/21	U	1	1	25243	0.137308
21	99	12641 HA 10/21	บ	1	1	387277	2.137903
22	100	12665 CT 10/21	U	<u> 7</u>	1	10124	0.053760
^ <b>२</b>	3	CCA	Ŭ	1	1	896232	4.950380
	<u> 1</u>	CCB	U	Ţ	1	-1020	-0.007825
3	0	Baseline	RB	<u>1</u>	<u>1</u> 1	0	-0.002186
26	101	12668 10/21	U	1		11937	0.063780
27	102	12664 10/22	U	1	ı	2526	0.011774
28	103	12665 10/22	U	1	1	377090	2.081605
29	104	12666 10/22	Ū	1	1	189860	1.046979
30	105	12668 10/22	U	1	1	10183	0.054083
31	106	12671 10/22	U	l	1	96333	0.530148
32	3	CCV	Ū	1	1	898288	4.961744
33	1	CCB	U	l	1	-1026	-0.007857
3	0	Baseline	RB	l	<u> 1</u>	0	-0.002186

Peak	Cup	Flags
1	2	
2	0	
- 2 m m m 6 7	0	LO
3	0	BL
3	0 1 2	BL
5	1	
7	2	
8	С	LO
3	O	BL
ر.	2	
	٦.	LO
12	3	
13	91	
12 13 14 15	92	
15	93	

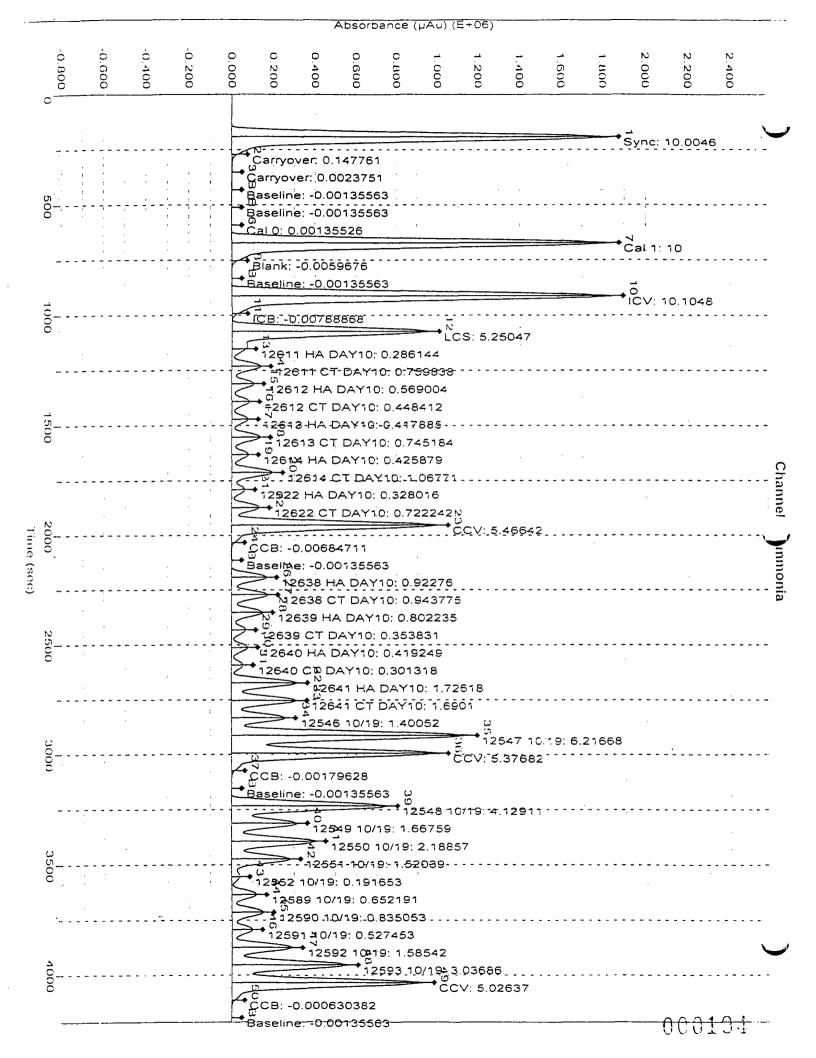


Peak Table: ammonia

File name: E:\FLOW\_4\102799E.RST Date: October 28, 1999 Operator: LKS

<b>W</b> ak	Cup	Name	Type Dil	Wt		Height	Calc. (mg/L)
1	2	Sync	SYNC	1	1	1827617	10.001991
2	0	Carryover	CO	1	1	25041	0.136264
3	0	Carryover	CO	1	l	756	0.003350
В	0	Baseline	RB	1	1	0	-0.000789
В	0	Baseline	RB	1	1	0	-0.000789
6	1	Cal 0	С	1	1	288	0.000787
7	2	Cal 1	C	1	l	1827253	10.000001
8	0	Blank	U	1	1	-47	-0.001044
Ω.	0	Baseline	RB	1	1	0	-0.000789
10	2	ICV	U	1	1	1820698	9.964125
11	1	ICB	Ŭ	1	1	474	0.001807
12	3	LCS	Ū	1	1	946075	5.177200
13	61	12609 10/19	Ū	ī	ī	19572	0.106333
14	62	12610 10/19	Ū	ī	ī	214916	1.175473
15	63	12611 10/20	Ū	 า	<u>-</u>	528736	2.893049
16	64	12612 10/20	Ū	า	ī	113899	0.622594
17	65	12613 10/20	Ū	า	ì	143349	0.783781
18	66	12614 10/20	บิ	1	1	181478	0.992465
19	67	12622 10/20	Ū	† 1 ·	ī	19245	0.104540
20	68	12589 HA 10/20	Ū	า	ì	107284	0.586392
21	69	12590 HA 10/20	Ū	1	ī	63518	0.346856
22	70	12591 HA 10/20	Ū	i	ì	62219	0.339743
25	3	CCV	Ū	1	ì	996983	5.455823
, 	1	CCB	Ū	ה ר	1	91	-0.000289
Ÿ	0	Baseline	RB	1	1	0	-0.000789
26	71	12692 HA 10/20	U	1	ì	133525	0.730012
27	72	12593 HA 10/20	บี	<u>1</u>	ì	367392	2.009997
28	73	12609 HA 10/20	Ŭ	- 1	1	2840	0.014754
29	74	12610 HA 10/20	Ŭ	ī	_ 1	256203	1.401440
30	7 <u>-</u> 75	12615 HA 10/20	Ū	1	1	15254	0.082697
31	76	12664 HA 10/20	Ū	1	<u> </u>	3156	0.016483
32	77	12664 CT 10/20	Ū	ì	<u>1</u>	15207	0.082443
33	78	12665 HA 10/20	บ	1	1	327542	1.791890
34	79	12665 CT 10/20	Ü	i 1	1	245075	1.340539
	80	12666 HA 10/20	Ū		1	413889	2.264477
35 36	3	CCV 11A 10/20	Ŭ	<u>.</u> 7	<u> </u>	996484	5.453096
37	1	CCB	Ū	<u>+</u> 7	1	423	0.001527
3 /	0	Baseline	RB	1 1 1	1 1 1	923	-0.001327
39	81	12666 CT 10/20	U	ì	÷	158879	0.868775
40	82	12668 HA 10/20	Ü		1	104857	0.573109
41	83	12668 CT 10/20	Ŭ	1 1	- 1	110728	0.605241
42	64	12671 HA 10/20	Ū	i i	1	34611	0.188643
43	85	12671 RA 10/20 12671 CT 10/20	Ŭ	1 1 1	ì	55855	0.304911
44	3	CCV	Ŭ	i i	1	1010641	5.530580
45	1	CCB	Ü	1	ĺ	6481	0.034681
E E	0	Baseline	RB	1	1	0	-0.000789

Flags



Peak Table: ammonia

File name: F:\FLOW\_4\102799D.RST Date: October 28, 1999 Operator: LKS 27

-		610					
<b>W</b> ak	Cup	Name	Type Dil	Wt 		Height	Calc. (mg/L)
-	2	Sync	SYNC	1	1	- 1828142	10.004595
2	Ō	Carryover	CO	ī	ī	27244	0.147761
3	Ö	Carryover	CO	1	1	682	0.002375
	0	Baseline	RB	1	_		
B B	0	Baseline	RB		1	0	-0.001356
5 6		Cal 0		1	1	0	-0.001356
	1		C	1	1	495	0.001355
7	2	Cal 1	C	1	1	1827302	10.000000
8	0	Blank	ū	1	1	-843	-0.005968
3	0	Baseline	RB.	1	1	0	-0.001356
± ∵	2	ICV	บั 	1	1	1846458	10.104847
<u>-</u> -	1	ICB	Ŭ	1	1	-1194	-0.007889
- 2	3	LCS	Ŭ 	1	1	959538	5.250472
13	31	12611 HA DAY10	IJ	<u>1</u>	1	52528	0.286144
<u>1</u>	32	12611 CT DAY10	Ū	<u>1</u>	1	_ 139074	0.759838
_ 5	33	12612 HA DAY10	ΰ	1	1	104208	0.569004
16	34	12612 CT DAY10	Ū	<u>1</u>	1	52175	0.448412
17	35	12613 HA DAY10	Ū	<u>1</u>	1	76598	0.417885
1.5	36	12613 CT DAY10	Ū	<u> </u>	1	136397	0.745184
19	37	12614 HA DAY10	U	<u>1</u>	1	78055	0.425879
20	38	12614 CT DAY10	U	<u>.</u>	1	195324	1.067707
2-	39	12622 HA DAY10	Ū	<u>1</u>	ī	60178	0.328016
22	40	12622 CT DAY10	Ū	1	1	132205	0.722242
~ <u>?</u>	3	CCV	Ū	<u>1</u>	1	998992	5.466417
Tea. 11	1	CC3	Ū	7	1	-1003	-0.006847
	0	Baseline'	RB	1	1	0	-0.001356
26	41	12638 HA DAY10	บ	-	1	168841	0.922760
27	42	12638 CT DAY10	บั	ī	1	172681	0.943775
23	43	12639 HA DAY10	Ū	1	1	146820	0.802235
29	<u>44</u>	12639 CT DAY10	บี	- 1	<u> </u>	64895	0.353831
20	45	12640 HA DAY10	บ	- 5	1	76847	0.419249
2.5	45	12640 CT DAY10	บ			55300	0.301318
32	47		บ บ	<u> </u>	1	315631	
33			U	<u> </u>	1	309039	
3 4	4.8 4.0		บ	1	1 1		1.690103
	49					256130	1.400515
3 3 3 3 3 4 4 4 4 4 4	50	12547 10/19	ប ប ប	-	4444444444	1136070	6.216682
30	3	CCV	U •-	1	-	982623	5.376822
<i>3 /</i>	<u> </u>	CCB		7	7	-81	-0.001796
=	0	Baseline	R3	1	1	0	-0.001356
39	51	12548 10/19	U	1	1	754658	4.129107
4.0	52	12549 10/19	Ü	2	Ţ	304925	1.667588
4 1	53	12550 10/19	Ū	1	1	400111	2.188566
42	54	12551 10/19	ប	1	1	278030	1.520385
43	55	12552 10/19	U	1	1	35264	0.191653
44	56	12589 10/19	Ū	ī	1	119406	0.652191
44 45	57	12590 10/19	U	ı	1	152816	0.835053
45	58	12591 10/19	Ū	1	l	96616	0.527453
47	59	12592 10/19	Ŭ	1	1	259912	1.585416
4.5	60	12593 10/19	Ŭ	1	I	555099	- 3.036863
ا تر ا	3	CCV	U	l	1	918593	5.026368
	3	CCB	U		1	133	-0.000630
3	O	Baseline	RB	1	1	C	

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0.500	0.400	0.300	0.200	0.100	0.000	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1.000	1.100	1.200	1.300	1.400	1.500	1.600
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						125 1256 1266	4 HA	71/7	1: 0.0 1: 0	3993. 15330	87 N5										
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-					5	Ēģse! • 123÷	ine: 0 46 HA	0.000 3.11/1	2994 15: 0.	46 2116	39										
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			. <b></b> .			ž254:	9 HA	11/1	6: 0.0	3540	51										- <b></b>
						1255 \$255 1255				3699 2913											
						2 <del>ابات</del>	548	CT 1	1/16:	0.589	065										
د.						ក្តី125 1255	550 C	T 11.	/16: 0 6: 0.	).3891 14168	165 37	3(									
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					-	₹259	2 CT	11/1	6: 0.0	4478	16										
	- <b></b>		. <b></b>			D	1	2509	CT.	10152 11/16	1.52	202.									<b>-</b> -
						£259	0 HA	11/1	7: 0.0	08693 02735	57										
						1 <del>2</del> 59:	2 HA 13 HA	11/1 <sup>°</sup> 11/1	7: 0.0 7: 0.	1323 11037	15 75										
۵						₹126	609 H	A 11	/17: 0	0.3582 03876	222	4								: .	
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Feak Yable: ammonia

File name: F:\FLOW\_4\112399C.RST Date: November 23, 1999 Operator: nvw

				••		
a.K	Cup	Name	Type Dil	Wt	Height	Calc. (mg/L)
7	2	Sync	SYNC	1 -	1 1139012	10.201578
<u>1</u> 2	0	Carryover	CO	1	1 4260	0.038450
3 H H &	0	Carryover	CO	1	228	0.002345
3	0	Baseline	RB		1 0	0.000299
3	0	Baseline	RB		1 0	0.000299
5	l	Cal 0	С		1 -67	-0.000300
7	2	Cal 1	С		1 1116505	10.000001
8 33 20	0	Blank	Ū	<u>1</u>	3 817	0.007615
3	0	Baseline	RB	<u>1</u>	1 0	0.000299
10	2	ICV	U	<u>-</u>	1 1151190	10.310650
	1	ICB	Ū	1	<u>-777</u>	-0.006659
12	3	LCS	Ŭ		1 601625	5.388603
13	31	12639 HA 11/10			1 4085	0.036883
14	3.2	12640 HA 11/10	บ 	1	1 2793	0.025316
25	33	12641 HA 11/10	บ บ	1	1 2793 1 6435 1 23411	0.057931
24 25 26 27	34	12665 CT 11/10	Ū	<u> </u>	1 23411	0.209970
- /	35	12668 CT 11/10	ប 	1	1 31353	0.281107
2 9 1 2 0 2 0	36	12664 HA 11/11	บ บ	1	1 31353 1 4426 1 17084 1 152272 1 2598 1 3573 1 598809	0.039939
- 5	37	12665 HA 11/11	∵ 	1	1 17084	0.153305
4 U 6 5	38	12666 HA 11/11	ប 	<u>-</u>	1 152272	1.364084
21 22	39 40	12668 HA 11/11	ਹ 	<u>.</u>	1 2598 1 3573	0.023567 0.032304
23	3	12671 HA 11/11 CCV	ט ט	1	1 598809	5.363383
2 <b>3</b>	ے 1	CCV	Ū			0.005082
اسا	Ö	Baseline	RB	<u> </u>		0.000299
26	4 <u>1</u>	12546 HA 11/16	T U	<u>ī</u>	1 0 1 23604 1 74150 1 69409	0.211699
27	42	12547 HA 11/16	Ü	<u>1</u>	1 23604 1 74150	0.211695
28	43	12548 HA 11/16	IJ	÷ 5	1 69409	0.621947
29	44	12549 HA 11/16	์ บ			0.035405
3 0	45	12550 HA 11/16	7	-	1 3920 1 4098	0.036999
3.2	46	12551 HA 11/16	Ū	<u> </u>	1 3219	0.029130
3.2	47	12552 HA 11/16	บ	1	1 2085	0.018975
3.3	4 â	12548 CT 11/16	$\overline{U}$	1	1 65738	0.589065
34	49	12550 CT 11/16	IJ	<u>1</u>	1 43418	0.389165
3.5	50	12551 CT 11/16	ប	1	1 15786	0.141687
3.6	3	CCA	ប ប ប	<u> 1</u>	1 597690	
37	<u> 1</u>	CC3	ij	1	1 417	
67 90123 334443	0	Baseline	R3	1	1 0	
3.9	51	12552 CT 11/16	บ บ	<u> 1</u>	1 7222	
40	52	12592 CT 11/16	Ũ	<u>1</u>	1 4967	
<u>.</u>	53	12593 CT 11/16	ט ט ט	<u>1</u>	1 11302	
42	54	12609 CT 11/16	IJ	1	1 181072	1.622023
43	55	12589 HA 11/17	บ •-	1	2 9673	0.086932
4 5 6 7	56	12590 HA 11/17	U 	<u>-</u>	1 3021	
÷ 0	57	12592 HA 11/17	บ 	<u> </u>	1444	
4 D	58 E 0	12593 HA 11/17	U	7	1 12290	
48	59 60	12609 HA 11/17 12610 HA 11/17	บ บ	÷	1 15786 1 57697 1 597697 1 2 4967 1 227 1 23072 1 31073 1 42967 1 122969 1 2963 1 2963 1 2963 1 397042	
4.9	3	CCV FA 11/1/	U	÷ 7	1 597042	
و بـ	3 1	CCB	U	÷ 1		
ايسا	2	Baseline	RB	÷ 1	1 -232 1 0	
E 2	€1	12615 HA 11/17	U	÷	1 3020	
53	62	12613 ISA 11/17 12611 CT 11/17	Ū	ਹਰਹਰਹਰਹਰਹਰਹਰਹਰਹਰ	1 12580	
54	63	12612 CT 11/17	Ü	ì	1 12456	0.111854
			-			

Peak	Crb	Name	Type Dil	ìхt	:	Height	Calc. (mg/L)
55	64	12613 CT 11/17		1	1	7343	0.066061
5.6	55	12614 CT 11/17	Ü	1	1	3986	0.035998
57	6.5	12622 CT 11/17	IJ	<u>1</u>	1	2217	0.020156
5.8	3	CCV	Ü	1	1	592836	5.309892
59	<u> 1</u>	CCB	ប៊	ī	1	111	0.001298
3	0	Baseline -	RB	1	1	. 0	0.000299

Peak	СлБ	Flags
SIGNETIC	2 0 0 0 1 2 0	FO BF BF
3	0 2	31
	200001200013333333334 4444444444444444444444444	LO
8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 1 2 3 4 5 6 7 6 9 0 3 5	<del>5</del> -1-1
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	90034040907090 45 55555555555	EL

#### **AMMONIA ANALYSIS**

client: Meuzie-Ceura Ct. chronic

BTR Number: Sever

Sample Date	Sample Description	10N NaOH (ml)	50 mL Sample (ml)	Meter Reading NH₃-N (ppm)	
	Calibration:				
	1 ppm	<b>/</b>		1.55	
	5 ppm			5.52	SLOPE = -58.4
	2 ppm EXT, STD.	V	/	1.92	
	O1 510 pm				
	Blank (DI)		/	L0.5	
11/29	12550 BTOX-D-2]	<u> </u>	/	<b>40.5</b>	
11/29	12551 [BIOX-D-3]		/	<b>&lt;</b> 0.5	
11/29	12612 BP-1Barow P.H	/		40.5	
11/29	12613 BP   Burrow PHING			<b>≺</b> 0.5	
	105 STD. check (015)	_/	/	0,491	
	JG ( )			ľ,	
11/29	12668 [LABOC-US]		/	<b>40.5</b>	
12/9	12548[BTOX-C-3]	/	/	40.5	
12/13	12609 FE-1 Dead Creek	V	/	40.5	
/	0,5 STD. check	/	/	0.490	
	Blank (DI)	/	/	~0.5	
	- /				
			<u></u>		

Analyst:	JG	Analysis Date:	12	1221	199
_				7	

Reviewed by:  $\frac{12/22/99}{2}$ 

ammonia.lwp

10(12/99

	NVW	JWW
# Surle TD	40.5	40.5
2 8 15		
1, 18589 0		
2 590 φ		
3 591 6		
Y. 592 0		
5. 593 0		
6. 10609 0		
7. 10610 B		
<u>8. 16615 Ø</u>		
9. 12611 0		
10. 612 7		
613 0		
12. 61Y Ø		
13 12672 Ø		
1.06 2.0		
15 12639		
12640 0		
16 12546 AW		
19 547 PW		
26. 548 FW	) 	
	NW	
	10/17/83	13/12/99
		15/1-15
· · · · · · · · · · · · · · · · · · ·		

• • • • • • • • • • • • • • • • • • • •	4BS ample ID	NVW	JWW 20-5
	a year to	40.5 ppm	-
	2664 PW,	<u> </u>	
	43 65 PW		
	671 PW		
	0546 Ø	-	-)
	576 0		· · · /
	9549 0		
_	550 0		
. ^	551 0	·	
	V 552 (V) 2664 (V)		-
12	665 0		
13	666 Ø	:	
14	668 0		
15	671 4	<u> </u>	
		10/12/9	() 10/12/99.
<u></u>			
		· · · · ·	

NVW	July
<0.5 ppin	5 LO-5 ppm5
1. 12549 PW Y	
2 550 PW (	
Z 550 PW ( 3. 12 551 PW	
4. 10 589 PW	_ /
5. 590 PW	
6, \ 591 PW	
7. 592PW	
5, 593 PW /	
9. 10609 PW	
10. 12610 PW	
- CILPW	
12. 612 PW	
13, 613 PW	
IY. GIY PW	
15, 12638 PW	
16. 639 PW / 17. 640 PW	
15, 640 MM / 18, 641 PM /	and the second s
17. 17666 PW L	<u> </u>
20, 17666 W N	
WW man	
10/12/90	() 12/99
\$ 5.0 ppm MS	

Client: Menzie-C	Cura & Assoc.	Pro	ect: 9903	3	BTR: 3615					
Date sediments	distributed to	test &	hambers (	100 mL homoge	enized_sediment):					
H. azteca acu	Date sediments distributed to test chambers (100 mL homogenized sediment):  • H. azteca acute test: 10/6/99    10/18/99; ALL SAMPLES SEE TO SAMPLES SEE TO S									
• C. tentans ac	ute test: 10/6	/99 ·		•		į				
• H. azteca chr	onic test: 10/	18/99:	ALL SAM	PLES JGfor 15	S					
<ul><li>H. azteca chr</li><li>C. tentans ch</li></ul>	ironic test: ්ර	548,	12550,12	551; 10/18/90	JOGELS					
10/28/99 - Lozden sodineris for 20x moles (12548, 12550, 12551, 12552,										
Sample	porew p	orew	porew		12542, 12593, 12	609) 1/2				

Sample	porew	porew	porew	12592, 12593, 12609)
Number	pH	H2S	Amm	Sediment Visual Characterization
12546	6.9			Visicus mud, 100 Overlying water
12547	7.0			Liquid, fine mud many freshwater gastropoids 1 removed visible gastropods 1467
				- 1
12548	7-0			Liquid mud, gastropads present, remaind
12549	7.0			Soft mud, pine nudies, some overlying water
12550	7.0			soft mud with overlying water fine need les
12551	7.0	· · · · · · · · · · · · · · · · · · ·		soft mud with overlying water
-				
<del></del>		! 		
<del></del>				
<del></del>		<del></del>		
		· · · · · · · · · · · · · · · · · · ·		
12552	1,149			EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3).
LCS	m/210199			Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia

Reviewer: Date: 1/10/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Client: Menzie-Cura & Assoc.	Project: 99033	BTR: 362	22 / 3629
Date sediments distributed to t			nent):
• H. azteca acute test: 10/7/99	941c/18/99 JG TM	(Hystells rejest)	
• C. tentans acute test: 10/7/9	99 ′		
H. azteca chronic test:			Wassen Incan
• C. tentans chronic test: 10/	18/99: 13592,12	593.12609 TM	Sieved to remove
	<i>y</i> ,	,	indigenous charación
			(for C.t. onle

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization	
12589	7.1	·	d	chrown muddy selinent with sticks a	hoi
12590	6,9		d	khrown muddy selinent with sticks a vegetative vegetative vegenative mud with veg mat	nat eu
12591	69			birown rund with veg material	
¥ 12592	7.1			dk brown mud with little veg mate	]. 214
12593	7.0			black watery much w/petrolium-like ode	i
12609	7.1			thick ak, brown ashesive much with	\re
12610	7.2			ak brown very Thick cohesive muid	
				w/some veg	٦
				materia	1
					Ì
					1
		<del></del>			
					1
12615				EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3).	
LCS			}	Stored dry, then hydrated prior to addition to test chambers.	

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by: 11 ( Date: 10 ) 9 9

Reviewer: Date: 12/10/99 Laboratory. Aquatec Biological Sciences, South Burlington, Vermont

000204

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Client: Menzie-Cura & Assoc. Project: 99033 BTR: 3629 / 3633

Date sediments distributed to test chambers (100 mL homogenized sediment):

H. azteca acute test: 10/8/99 C. tentans acute test: 10/8/99

H. azteca chronic test:

	_		_		
0	С.	tenta	ns ch	roni	c test:

Sample	porew	porew	porew	
Number	рН	H2S	Amm	Sediment Visual Characterization
12611	6.8			black mud w/leaf litter
12612	7.7			Fine Brown mud
12613	7.7			Soft Brown mud
12614	7.5			Soft Brown mud
12638	7.6			Soft Brown mud
12639	7.3			sticks + leaves on top + through out conesive mud, dark.
12640	7.2			Sticks + leaf litter Dark thick mud
12641	72			soft Brown mud
12622				EPA artificial control sediment (77% med. and fine sand;
LCS				17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

000205

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Client:	Menzie-Cura	& Assoc.	Project:	99033	BTR:	3641

Date sediments distributed to test chambers (100 mL homogenized sediment):

H. azteca acute test: 10/9/99
C. tentans acute test: 10/9/99

H. azteca chronic test:C. tentans chronic test:

Sample Number	porew pH	porew H2S	porew Amm	Sediment Visual Characterization
12664	7.8			fine cohesive mid.
12665	7.3			fine soft mud
12666	75			fine. Sticky/Cohesive mud
-12667-JG 12671	7.4			fine, brown mud-chironomids
12668 LCS				EPA artificial control sediment (77% med. and fine sand; 17% kaolinite clay; 5% 0.5 mm-sieved peat; 1% CaCO3). Stored dry, then hydrated prior to addition to test chambers.

Extract porewater, measure and record pH, decant and preserve sulfide and ammonia samples.

Entered by:

Date: 45/6/36

Reviewer: Date: 17/099
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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## Preparation of Formulated Control Sediment for Freshwater Sediment Toxicity Tests

Procedure based on EPA/600/R-94/024

Batch No. 10/4 Preparation Date: 14/99 Prepared by: 116.

Ingredient	Amount (g)	Percent composition
Fine and		
Fine sand Medium sand	1848 924	77
Kaolinite clay	612	17
Blended and 0.3 mm sieved Canadian sphagnum peat	180	5
CaCO3	36	1
Total	3600	100

Store well-mixed and dry in a sealed Rubbermaid box. Label by batch number. Store copy of this documentation in project file. Store original in Sed/Water preparation notebook.

Hydrate to a cohesive sediment consistency before use.

#### Week of October 17, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	$\checkmark$	/	/		V		<b>V</b>
Noon delivery cycle				,		_	
splitter boxes filling?	<u> </u>	1	<b>V</b>	\\\ √.		V	
syringes filling?				7		V	
• needles flowing?				V	/	7	
beaker screens clear, flowing?		/	V	V	/		
drainage to waste ok?			V		1/		
• empty waste buckets 2 wice					1	VV	11
Test monitoring DAILY							
• test temperature ok?	V		/			V.	
• D.O. ok?	1/1	<b>/</b>				V .	
check for floating organisms		V ,	V	1		1	
• feeding completed?	$\overline{}$	<b>V</b> (1)	1				
Additional activities							
Prior to midnight fill reservoirs (1L)	_/_			\/,	V	V	
Check sediment water supply			./		1/		1
Corrective Action / Comments	<del>-, -, -, -, -, -, -</del> ,						
Initials/Date	In sc	73.45	767	10/30	15/21	10/38	16/23
Procedure: All operating system		<del></del>		·····			

<u>Procedure</u>: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

Comments:	C. HARN	chanic Test	ser ups	nere	ted on	Dry -1	(dain	
1100	TO Olganism	eddimons)	1:/1	0/69				
0	<i>V</i>		· ·					
					Expesy	e um	tor	/+/.

Reviewer Date 129/99
Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

Expessive with for H.2. chining

= Lake / Recon Mix

Experience water by C.T. chinase

= Recon Water. [0]21/99

C. C. Osendelfondor [0]21/99

#### Week of October 31, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs			<del></del>			7.	<del></del>
(1L)	V		V	$\sqrt{}$	V		
Noon delivery cycle							
splitter boxes filling?	/	~	IV.	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	V		V
syringes filling?							
• needles flowing?			\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\		/		
beaker screens clear, flowing?	1	V	$\vee$	V	V	1	
drainage to waste ok?	4	1/			<u></u>	. /	4
• empty waste buckets?	VV	VV		VV	1/1/	VV	1
Test monitoring  test temperature ok?		V	· ·	V	V	~	1
• D.O. ok?		V	· ·				-
check for floating organisms	1//						1
• feeding completed?		V			3/		
Additional activities						·	
Prior to midnight fill reservoirs (1L)	<b>\</b>	V		I V	1	1 1/	
Check sediment water supply		V				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
Corrective Action / Comments							
Initials/Date	10/31	11/1=1€	1/2/10	11/3	114	11/5	11/6
	/	,				•	,

<u>Procedure</u>: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

Comments: 11/5/99/midnist	renewal missed Renewal init	iated at 09:20
"N∞3",	enewal conducted at 14:00 11/6 JG	11/6/99 JJG

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

#### Week of November 7, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs							
(1L)		<b>V</b>	<u> </u>		<u> </u>		
Noon delivery cycle							_
• splitter boxes filling?			V,	V		;/	V
<ul><li>syringes filling?</li></ul>				<b>V</b>			V
• needles flowing?		V ,	<b>'</b>	<b>\</b>			
beaker screens clear, flowing?	<b>/</b>	V /	V.				
drainage to waste ok?		V .	1/	1	/ /	i/	1
empty waste buckets?		VV	VV	VIV	IVIV	V V	V
Test monitoring			, — — — — — — — — — — — — — — — — — — —	,			······
test temperature ok?	<b>/</b>	V .		·/	V		
• D.O. ok?							
<ul> <li>check for floating organisms</li> </ul>	V	V	V	V	V		1
feeding completed?		<i>\sqrt{\sq}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}</i>		V	\ \ \		
Additional activities	,					,	
Prior to midnight fill reservoirs (1L)		1	1/	V	V		
Check sediment water supply			1.	<i></i>			
·	·			·	<del>!</del>	······································	<del>!</del>
Corrective Action / Comments	18	·					
Initials/Date	TM 7749	10/8 m	m 5	11,10	1m	1412	J <del>e</del> 11/13
Procedure: All operating system tests are in progress. Corrective on this form. If project-specific d Documentation form) and include	e action mu locumentat	ist be takei tion is requ	n wheneve iired, write	er appropri	ate. Docur	ment corre	
Comments:							
	7						

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

#### Week of November 14, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs (1L)	V		V	<b>\</b>			
Noon delivery cycle							_
• splitter boxes filling?	V	<b>√</b>	1		\.	· V	
syringes filling?					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
• needles flowing?						V	
beaker screens clear, flowing?	1	1	1		- /	/	
drainage to waste ok?	1/	Y	4 /	4		4	
empty waste buckets?	VV	VV		VV	VV	V V	VV
Test monitoring	,			1	Ι,		
• test temperature ok?	V	1		V	1		
• D.O. ok?						1/6	-,
check for floating organisms	V.	1/	1			V/	
feeding completed?	V		i			V	
Additional activities  Prior to midnight fill reservoirs (1L)  Check sediment water supply	V			V			
Check sediment water supply	<b>√</b>	·/				<u></u>	
Corrective Action / Comments	- 16	- ir	100	16		10	
Initials/Date	m 1499	1/15/99	11/16/1961	1717	45	1119	Leibo
Procedure: All operating system tests are in progress. Corrective on this form. If project-specific documentation form) and include	e action mu locumenta	ist be take tion is requ	n wheneve uired, write	r appropri	ate. Docur	nent corre	
Comments:							
				<del></del>			

Reviewer Date 129/99
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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

#### Week of November 21, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
					1	//	
Prior to noon fill reservoirs (1L)	$\checkmark$		<b>√</b>	i/	i/	$\bigvee$	
		<u> </u>	<u> </u>	<del> </del>	·	<del></del>	<del></del>
Noon delivery cycle					AT		
• splitter boxes filling?	\ <u>\</u>		/		11:00m		
syringes filling?			V		1//-		
• needles flowing?		<u> </u>	V		/_		
beaker screens clear, flowing?	V,	V	1/			1/	
drainage to waste ok?	✓ <u> </u>	1/	1		1	[ حمار	/ //
empty waste buckets?	VV		$V \mid V$	47	1/1/	11/	VIV
Test monitoring	<u></u>			·	,		
• test temperature ok?	$\sqrt{}$	<u>/</u>		1		\ \ \ \	
• D.O. ok?	~		//	1	1	ارتحما	
<ul> <li>check for floating organisms</li> </ul>							
• feeding completed?	$\sqrt{}$	~	1		1705	<i>'</i>	
Additional activities	1						
Prior to midnight fill reservoirs (1L)	<del></del> √, -	V		1			7
Check sediment water supply	$\overline{}$			V	1		V
		<del> </del>	<u> </u>	· · · · · · · · · · · · · · · · · · ·	<del></del>	·	
Corrective Action /				}	<del></del>	1	
Comments		]			}		
,			7 21.2	 	111	2	<del>-11/</del>
	W/51	16	11/23	Jm 124	MX.	10/	792
Initials/Date	Me.	11/22	11/23	p man	11/27	11/26	14/4
December All expensions systems	a liatad ah		l aa ah aakaa	انسسمانا	والمراد والمواد	. 	l Administra
<u>Procedure</u> : All operating system tests are in progress. Corrective					•		•
on this form. If project-specific d							401.011
Documentation form) and include				·	· · · · · · · · · · · · · · · · · · ·	·	
Comments:							

Reviewer Date 12999
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Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

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#### Week of November 28, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs							
(1L)	V	\ \ \	V	<u> </u>		V	V
Noon delivery cycle							
<ul> <li>splitter boxes filling?</li> </ul>	V	V'_		\ \ \ \ .			
• syringes filling?		<b>V</b>					
• needles flowing?		V	V	V		V	<b>/</b>
beaker screens clear, flowing?	V	V	V				
drainage to waste ok?	4	$\sqrt{}$		1/	Jy'		141
empty waste buckets?	V V	V V	$\sqrt{}$	VV	V/~	VIV	VIV
Test monitoring	<del>/</del>	<del></del>		<del></del>	<del></del>	<del></del>	<del></del>
• test temperature ok?	V		V	Y	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1/	<u> </u>
• D.O. ok?		1	1	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	<u>'                                   </u>		1-/-
check for floating organisms		<del></del>	V	<del>  '//</del>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	LV/	<del>                                     </del>
• feeding completed?		<u> </u>		l V		I V	
Additional activities		/			<b>4</b> _	<i>L_</i>	
Prior to midnight fill reservoirs (1L)	V/					i/,	
Check sediment water supply		7		V			
	<del></del>	<u> </u>		4		<u></u>	<del></del>
Corrective Action / Comments							
Initials/Date	11725199	11/29 m	m30	13/1	13/3-	143	JG, 12/4
Procedure: All operating system tests are in progress. Corrective on this form. If project-specific d Documentation form) and include	e action mu documental	ust be take ation is requ	en wheneve uired, write	er appropri	iate. Docur	ment corre	
Comments:							

Reviewer Date 12/9/99 seddelfw.doc

Laboratory: Aquatec Biological Sciences, South Burlington, Vermont

000213

#### Week of December 5, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Prior to noon fill reservoirs		/	7				
(1L)		V	<u> </u>	V			$\checkmark$
Noon delivery cycle							
		<del></del>			1		<del></del>
• splitter boxes filling?	! /	V			V	V	V
• syringes filling?		V		V			
• needles flowing?	1 /	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	V	V		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
• beaker screens clear, flowing?	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	/	<u>                                     </u>	V/		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
drainage to waste ok?	! // /	7/		X	-4-/	-/-	
empty waste buckets?	YV	V V	$ \wedge \wedge$	VV	VV	VV	
Test monitoring	,	,	,		•	,	1
test temperature ok?	1/	1	Van	V			
• D.O. ok? # 5244/4	611 /ow,			(1) V			
check for floating organisms		V.			1 /		
feeding completed?				V		Shipped	
	·		<del></del>	·	<del></del>	<del>* 3</del> E-	
Additional activities		,		,		,	
Prior to midnight fill reservoirs (1L)		1/			11/	1	
Check sediment water supply		·V		1			
<u> </u>			1	<u> </u>	<del></del>		<u> </u>
Corrective Action /							
Comments	1						
	16	-16-00	11/	<u> </u>	1700	-6-	16
Initials/Date	13/5/99	13/2	19/3	Tm ialy	12/9	12/10	12-111
	1 1	1 1 5 1 5	1 1 1	1 14-	<u></u>	<del>'/</del>	<del></del>
Procedure: All operating system tests are in progress. Corrective on this form. If project-specific of Documentation form) and include	e action mu locumenta	ist be take tion is requ	n wheneve uired, write	er appropri	ate. Docu	ment corre	•
Comments: Je Samile	· ·	zerede		43 100	rewol.	12/5 70	10ंस्ट्रट
		eved (				12/8 TW	
	<u> </u>						

Reviewer Date 12/22/99 seddelfw.doc Laboratory: Aquatec Biological Sciences. South Burlington, Vermont

000214

#### Week of December 12, 1999

ACTIVITY / DAY	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
	/	-1					
Prior to noon fill reservoirs (1L)							
Noon delivery cycle							
<ul> <li>splitter boxes filling?</li> </ul>							
• syringes filling?							
• needles flowing?							
beaker screens clear, flowing	? \						
• drainage to waste ok?	1						
<ul> <li>empty waste buckets?</li> </ul>				1			
<ul><li>test temperature ok?</li><li>D.O. ok?</li></ul>	1	<u> </u>					<u> </u>
	<u> </u>		1				<u> </u>
check for floating organisms	+-/	<u> </u>	<u> </u>	<u>!</u>			1
feeding completed?	SKipped	<u> </u>		<u>!</u>	<u> </u>		1
recoming completed.	1 50 FT		<u> </u>	<u></u>	<u></u>	<del>'</del>	1
Additional activities							
Prior to midnight fill reservoirs (1L)							
Check sediment water supply		1	1		1		<u> </u>
		<u> </u>	<u>'</u>	<u> </u>	1		<del>!</del>
Corrective Action / Comments							
	m		i	<u> </u> 		<u> </u>	

<u>Procedure</u>: All operating systems listed above must be checked on a daily basis when sediment toxicity tests are in progress. Corrective action must be taken whenever appropriate. Document corrective action on this form. If project-specific documentation is required, write a brief description (on Project Documentation form) and include with the test data package.

Comments:			
		<u>-</u>	

Reviewer Date 12/21/49
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#### SEDIMENT TEST MANUAL RENEWAL

#### DAILY SCHEDULE: MORNING (0700 - 0800) AND EVENING (1800-1900)

#### October, 1999

Day of Month	AM Renewal Time	Initials	PM Renewal Time	Initials
1	11116		111116	
2	<del> </del>		<del> </del>	
			1	
3	<u> </u>			
4				
5		<del></del>	<u> </u>	
6			<u> </u>	
7	ļ		<u> </u>	
8				
9			2230	
10	09:00	てゴG	17:00 C.T.	~ m
11	09:00	77G 77G	19.00	P.B
12	0715		\$7:00	777
13	07:00	TM	1830	
14	07:00	7727	1830	
15	07:40	33G	1815	A
16	07:20	AS .	18:30	JJG
17	07:30	325		
18	07:30	m		
19				
20	07:30	326-		
21	0.72184	1	1167:00 19:D	TM
22	07:20	4.5	19:00	TM
23	07:3c	1156	18,00	45
24	07:30	375	19.00	717
25	07:00	771	1900	
26	07:00	TM	OF CORI	00 7 3
27	07:00	TM	-07:00/9:	
28	17:00	TM	C7.00 9	
29	07:00	771)	19:00	36-
30	17:15	15	18:30	30
31	(17:30)	7/2	17:00	32
				<u> </u>
<del></del>		<del></del>	<del></del>	
L	<del></del>	<del></del>	<del></del>	<del>l</del>

12/22/91

#### SEDIMENT TEST MANUAL RENEWAL

#### DAILY SCHEDULE: MORNING (0700 - 0800) AND EVENING (1800-1900)

#### November, 1999

Day of Month		Initials	PM Renewal	Initials	
	Time		Time		
1	07:30	76	19:00	7M	
2	07:15	Im	18:45	JG-	
3	07:10		18:45	Im	
4	27:25		19:00	Tm	
5	07:25		18:30	JA	
6	08:30	JG	(B. (B)	15	
7	08:00	IM	18130	76	
8	04:00	16	18130 19.30	1 7m	
9	07:00	7m	19:00	30	
10	07.00	7771	13:30		
11	07:00	Tm	1900		_]
12	28:00		19:00	36-	
13	07:00	JS.	19500	76	
14	07:00	im	19:15	スピー	
15	08:00	JG	19:00	TM	
16	07:00	TM	19:00	1G	
17	07:30	76	19:00	7m	
18	07:00	TM	18:30	12	] On "la
19	07:C0	un			All seame
20					placed wh
21			19:15 Sysia	clear I	ا ماندده سال
22	<u>-</u>		19:00 System	lovedic The	2000 mercia
23	07:00	Im system chear	18500	76-	renewed sy
24	07:00	My System Check	1900	TM	- wy renewal
25	07:00	77m	1915		14:00
26	OFICE	JE for Cd	1955		azily or
27	09:30	JG-SW	tomcheck		] _3
28	08:30	Mn system stock	18.0	JG	_
29		System check		Mys	
30	07.30 TM S	stein check	18:00	76	
31					
		1	 		
			: 		

#### List of events where data for time to mortality of emergent flies was not generated

SAMPLE	REPLICATE	PARAMETER	DAY	EVENT
12548	C	FS	36	NR
12548	D	MS	27	ESC
12548	D	MS	28	NR
12552	Α	FS	26	NR
12552	D	FS	24	ESC
12552	E	MS	26	NR
12592	H	FS	31	NR
12592	Н	MS	31	NR
12592	H	MS	31	NR
12593	F	MS	23	ESC
12593	E	MS	24	ESC
12593	E	MS	25	NR
12593	D	FS	31	ESC
12609	В	MS	32	ESC
12609	D	MS	37	ESC
12609	E	MS	33	NR
12614	G	FS	27	ESC
12622	Α	MS	23	ESC
12622	E	FS	24	NR
12622	F	FS	27	NR
12668	A	FS	27	NR
12668	D	FS	26	NR
12668	D	MS	26	NR
12668	F	MS	25	NR
12668	Н	MS	22	ESC

#### Note:

- -On day 37 a fly of unknown sex emerged from sample 12665 F, it was not recorded on the data sheet due to its unknown sex. The fly was included in the total number of emergent flies.
- -An emergence case was found in sample 12665 H prior to the installation of emergence traps. Survival and sex of the fly were not recorded but the fly was included in the total number of emergent flies.
- -A female from 12668 C produced a primary egg case prior to being collected. Egg data was not recorded.

MS= Male Survival

FS= Female Survival

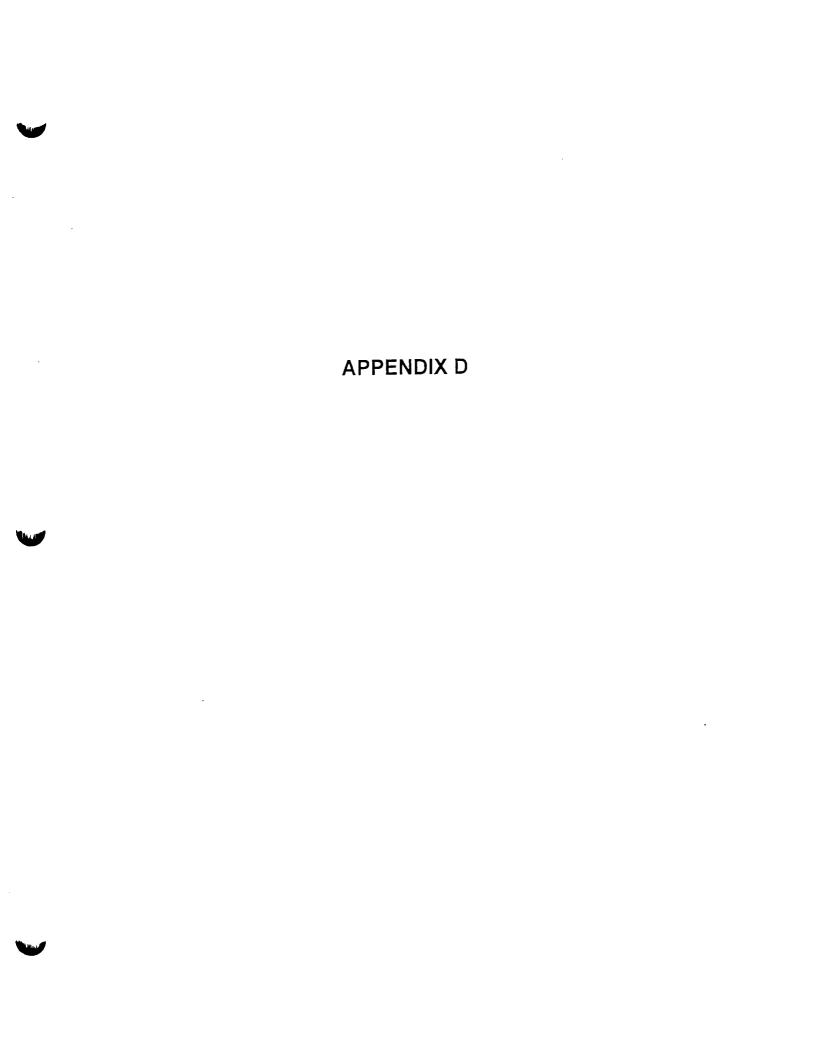
UE= Unhatched Eggs

INJ= Injured

NC= Not Counted

NR= Not Recorded

ESC= Escaped



# Reference Toxicant Control Chart Chironomus tentans in Potassium chloride (g/L)

		Organism					
Test Number	Test Date	Age (Days)	96-Hr. LC50	Mean LC50	Lower Limit	Upper Limit	Organism Source
1	10/31/97	9	5.612	5.61			Aguston Biological Colonson
2	11/02/97	9	3.466	4.54	1.50	7.57	Aquatec Biological Sciences Aquatec Biological Sciences
3	11/02/97		5.400 6.484	5.19	2.08	8.29	
		10 9		- · · -			Aquatec Biological Sciences
4	11/10/97		5.000	5.14	2.60	7.68	Aquatec Biological Sciences
5	08/23/98	11	6.484	5.41	2.90	7.92	Aquatec Biological Sciences
6	09/15/98	9	6.674	5.62	3.15	8.09	Aquatec Biological Sciences
7	10/23/98	10	6.484	5.74	3.40	8.09	Aquatec Biological Sciences
8	11/10/98	9	3.827	5.50	2.94	8.07	Aquatec Biological Sciences
9	06/20/99	9	6.804	5.65	3.10	8.20	Aquatec Biological Sciences
10	06/24/99	11 and 12	5.946	5.68	3.27	8.09	Aquatec Biological Sciences
11	06/26/99	9 and 11	6.804	5.78	3.40	8.17	Aquatec Biological Sciences
12	07/15/99	13	6.484	5.84	3.53	8.15	Env. Consulting & Testing
13	07/16/99	10	6.771	5.91	3.64	8.18	Aquatec Biological Sciences
14	07/16/99	9	3,400	5.73	3.17	8.29	Aquatec Biological Sciences
15	07/16/99	8	6.804	5.80	3.27	8.33	Env. Consulting & Testing
16	09/13/99	10	6.095	5.82	3.37	8.27	Aquatec Biological Sciences
17	10/07/99	11	7.071	5.89	3.45	8.34	Aquatec Biological Sciences
18	10/11/99	10	6.804	5.95	3.53	8.36	Aquatec Biological Sciences
19	10/27/99	8	7.071	6.00	3.60	8.40	Aquatec Biological Sciences
20	11/13/99	12	6.804	6.04	3.68	8.41	Aquatec Biological Sciences

